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The effects of metacognitive strategies on reading comprehension: A quantitative synthesis and the empirical investigation.

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The Effects of Metacognitive Strategies on Reading Comprehension: A Quantitative Synthesis and the Empirical Investigation

Abstract

The purpose of the study was to investigate the effectiveness of metacognitive strategies on reading comprehension by means of (a) a meta-analysis and (b) an experiment designed following the meta-analysis implemented in Sarawak, Malaysia. Before the meta-analysis, the prevalent theories and issues in the reading literature such as metacognition, models of reading, measurements, motivation and previous meta-analysis were discussed to provide a better understanding of the research area in this study.

A meta-analytic procedure conducted to review the primary research studies of metacognitive strategies used effect size as the measure of effectiveness. Searching for the articles and theses in the 1980s until 2001 yielded a record of 473 abstracts and articles from which there were twenty seven studies with a total number of eighty two effect sizes that could be quantitatively synthesized to compare the group performance of the experimental and control groups. The weighted effect size was 0.50 (95% CI = 0.45 to 0.56) when dependent effect sizes were synthesized, and 0.55 (95% CI=0.48 to 0.63) when the extreme 'outliers' or deviated effect sizes were excluded and independent effect sizes were created. Overall, the effect size was moderate indicating a positive outcome of the metacognitive strategies. The effect sizes were not homogeneous and further analyses of the qualitative and quantitative features of the studies were made to develop possible reliable estimates. Features considered were; publication, grade and ability levels, and design characteristics such as methods of assignment, length of treatment and the instructional variables.

The findings suggests that the use of metacognitive strategies with other instructional feature such as motivation improved the learners' reading comprehension by 0.76, depending on the students' grade and ability level. The effect was 0.70 when studies was conducted with the mixed ability group. However, the effect sizes were equally effective for younger students at grade 2-3 and those at the college where the effect sizes were 0.69 and 0.72. The smallest effect was on grade 10-11 students with an effect size of 0.23. Another important feature that might influence reading comprehension is the type of reading materials used. The effect was 0.70 when expository text was used compared to 0.50 with narrative text. The issues surrounding the instructional time remain unresolved for the elapsed time of <15 days, 15-25 days and >25 days were equally moderate at 0.49, 0.47 and 0.61 and the number of sessions of 1-5, 6-10 and >10 at 0.63, 0.65, and 0.40. Considering the students' ability level, perhaps extended guided practice, distributed within the time given for the research would improve the reading strategies used and subsequently improves learners' reading comprehension.

In addition to the meta-analysis, a small scale experiment using pre-test and post-test control group design with simple randomization was conducted to demonstrate the effects of metacognitive strategies on reading comprehension. The four metacognitive strategies taught includes hypotheses generation, questioning, summarization/paraphrasing, and verbalization (internally in a work alone condition or social communicated verbalization in a group work task). Analysis of covariance was used as the means for controlling the initial difference between the experimental and control group on their pre-test mean scores on their performance. The effect size was modest, d=0.36, when the strategies was used with the experimental group 1

(Metacognitive strategies /Alone+Verbalization)and 0.05 on experimental group 2. (Metacognitive strategies /Group+Verbalization)

The interplay of motivation in this research was investigated using the Motivated Strategies learning questionnaire and there was no significant direct relationship between motivational variables with performance with the experimental groups. In terms of self-regulated learning strategies, there was no significant relationship with performance except in experimental group 2, where there was a significant relationship between metacognitive self-regulated learning strategies and peer learning with reading comprehension at the post-test.

Further analysis of the qualitative data from the strategy used questionnaires responses explained the students' reasons for using/not using the proposed strategies during the treatment. Overall, the experimental group showed greater improvement over the control groups not only in the use of strategies taught during the training session, but were able to use the strategies flexibly with other strategies such as *skimming, rereading, underlining and summarizing/paraphrasing*. However, the difference in performance between the first and the second experimental group might be explained by the learning conditions and verbalization techniques employed during the research. The participants from the experimental group 2 particularly did not favour using verbalization (overtly in group) deemed as time consuming strategy by most of the participants. Nevertheless, these indicates their awareness of the flexible use of strategies for comprehension. Some participants even indicated the use of verbalization (aloud) if there is a need for clarification on certain sections of the passage given. Finally, the teachers' and students' opinion towards strategy use were positive as reflected from the questionnaire responses at the end of the study.

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CHAPTER ONE

Introduction

1.0 Introduction

The purpose of the study was to investigate the effectiveness of metacognitive strategy instructions on students reading comprehension. Metacognitive strategies or metacognitive regulation are sequential processes that one uses to monitor and control the cognitive activities, and to ensure that a cognitive goal such as comprehending a text has been achieved. The basic premise of this investigation is that, lack of metacognitive awareness and explicit instruction on comprehension strategies may hamper the quality of student's performance. Therefore, this study was guided by the theoretical and conceptual framework of metacognition.

1.1 Rationale for the study

Metacognition was introduced in the late 1970s and has received a great deal of attention from cognitive psychologist and reading researchers. Although the theory of metacognition originated from the research on learning and memory, the history of reading show the increasing influence of success in research studies by cognitive psychologists such as Kresutzer, Leonard and Flavell's (1975) on children's metamemory. These fields have provided the reading researchers with insights into research of reading comprehension and created an ongoing enthusiasm for further

exploration and investigation of reading problems within the theoretical and conceptual framework of metacognition.

Most research on reading comprehension has focused on the benefits of heightening students' awareness of the active role that is vital to successful reading. At the earlier stage, the research focused on the metacognition and reading comprehension from the developmental perspective. The research questions have centred on issues of whether metacognitive strategies can be taught successfully to facilitate the reading comprehension of young and poor readers. In more recent years, there are questions as to why should some interventions appear to work while others appear not to? How should the instruction be delivered? Under what conditions do interventions work best? And more, the discussion has turned to the metacognitive strategies in relation to such factors as motivation, self-regulation, verbalization and the context of intervention.

Via meta-analysis, 24 studies were examined in which the interventions were aimed to enhance the students' reading performance by using single strategy or multiple numbers of metacognitive strategies in combination with motivational variables. The different instructional methods attempted in the literature include reciprocal teaching, generative learning, self-instructions plus verbalization or the use of graphic/visual/imagery. These research studies were meta-analysed in the third chapter of this thesis and the effect size of reading comprehension was found to be in the medium range of d= 0.58. These studies have been replicated at various grade levels by different group of researchers from different academic institutions and such research inspired the present investigations. Further exploration of data in this meta-analysis discovered a positive treatment effect from studies using *motivational variable or graphic/visual/imagery* in combination with metacognitive strategies used

for the treatment. This suggests a need for the research on cognitive or metacognitive learning strategies that would consider the use of motivation in strategy instructions.

Previous research by Palincsar and Brown (1984) might have rooted reciprocal teaching instruction in the theoretical work of Vygotsky (1978) that provide the concepts of level of potential development, where the learners engage in "communicative actions" which include learner's joint activities with more capable partners, as well as learners' perception and processing of sociocultural artifacts. However, the Vygotskian theory did not provide much information on how to instruct children in the zone of proximal development. This study will not only examine the effectiveness of instructional strategies used via the meta-analysis, but also the conditions under which the facilitation of such learning can occur. Thus, a partial replication of the study examined the effectiveness of using metacognitive strategies in communicative or collaborative actions and in work alone conditions.

A random search of the ERIC database and Social sciences citation indexes from 1980s to 2001 using the keywords such as 'Metacognition' and 'reading comprehension' revealed a tremendous increase of research effort especially in the development of empirical research on the effect of teaching metacognitive strategies. With a diversity of research designs and findings, it has become difficult to draw an overall conclusion on the effects of metacognitive strategies based on the impressionistic literature review. It might be possible to reach stronger conclusions when more studies could be analysed using quantitative reviewing such as meta-analysis. However, only empirical studies could be reviewed using this method.

The meta-analytic study conducted in this research did not find any primary research or empirical investigation in this area particularly in Malaysia. Thus, a partial replication of study within the Malaysian context is crucial. The replication

will be conducted based on the findings or influential variables identified from the meta-analysis. The next section will explain the rationale for synthesizing the research using meta-analysis.

1.2 Reasons for the review

Jackson (1980) defined research review as follows:

> Some (reviewers) are primarily interested in sizing up new substantive and/or methodological developments in a given field. Some are primarily interested in verifying existing theories or developing new ones. Some are interested in Synthesizing knowledge from different lines of research, and still others are primarily interested in inferring generalizations about substantive issues from a set of studies directly bearing on those issues (p.438).

A synthesis of the research in education could be a great benefit to the educators, curriculum designers or instructional technologists. The research reviews in education are not uncommon in the publications such as *Review of Educational Research*, and *Review of Research in Education.* Most of the synthesis efforts have used a method of review referred to as "the narrative approach" (Glass et al., 1981). Within the narrative approach, a researcher attempts to logically synthesize the findings from a collection of studies on a given topic by looking for patterns in the studies reviewed (Marzano, 1998). This approach is highly susceptible to erroneous conclusions and more statistically based methods of research synthesis have been pursued (Wolf, 1986). One of the most popular of these statistically based methods is meta-analysis.

The inferences and synthesis are central to the behavioural sciences particularly the integrative research review due to the sharp increase in the number of empirical research. In addition, most researchers find they cannot keep abreast of primary data reports except within a few specializations (Cooper, 1982). In light of

the reviewer's task complexity, there is a need for the synthesis of separate empirical finding into a coherent whole with systematic guidelines that provides reliable and valid reviews. Cooper (1982) conceptualised the integrative review as a research process containing five stages: (1) problem formulation; (2) data collection; (3) evaluation of data points; (4) data analysis and interpretation; and (5) presentation of results. According to Cooper, each of the stage serves a function similar to the one it serves in primary research. Procedures employed in meta-analysis permit quantitative reviews and syntheses of the research literature that address these issues (Wolf, 1986).

Glass (1976) introduced the concept of meta-analysis as a means of combining results of different investigations on a related topic, since then the practice and theory of literature synthesis has been dramatically transformed. According to Wolf (1986), there are various potential problems with the traditional literature reviews that are addressed in a meta-analysis. These include: (1) selective inclusion of studies, often based on the reviewer's own impressionistic view of the quality of the study, (2) differential subjective weighting of studies in the interpretation of a set of findings, (3) misleading interpretations of study findings, (4) failure to examine characteristics of the studies as potential explanations for disparate or consistent results across studies, and (5) failure to examine moderating variables in the relationship under examination. With these problems in the traditional review of scientific data, "what is needed are methods that will integrate results from existing studies to reveal patterns of relatively invariant underlying relation and causalities, the establishment of which will constitute general principles and cumulative knowledge" (Hunter et al, 1982).

Given a large amount of data to be gathered, processed, assimilated and synthesized in many different specializations, the fundamental problem as referred to by Glass et al. (1981) is the inability of human mind to address this task reliably and

validly. Very often, the conclusions in the informal and narrative techniques of reviewing are very easily influenced by prejudice and stereotyping and there is no attempt at rigorous definitions and standardization techniques (Glass, 1981). Thus, under the pressure of burgeoning research literature, the old and informal narrative techniques of research review and integration are breaking down. Glass (1981) concludes that the traditional review of scientific data has typically been done in an unscientific, impressionistic fashion and contemporary research reviewing should be more technical and statistical than it is narrative.

The research on metacognition and reading comprehension is developing at an astonishing rate. It has become difficult to provide a clear answer to the question of whether metacognitive strategies can be effectively taught due to the complicated findings from various studies with different research designs. The differences in subject characteristics, researchers, length of treatment, assessments and other study characteristics led to difficulties in drawing conclusions on the effectiveness on the metacognitive reading strategies. Inevitably, some empirical studies generated significant results and others did not. In this study, meta-analysis, a quantitative synthesis was also conducted to assess the overall effect of metacognitive reading strategy instruction from 1980s to year 2001.

Meta-analysis provides an alternative to significance testing which Carver (1978) designated as a "A corrupt form of scientific method". Meta-analysis focuses on how much difference something makes (the magnitude of an effect) and not on whether or not the difference was statistically at a pre-specified level, its use encourages a more scientific approach to the interpretation of quantative results (Fitz-Gibbon, 1984). Significance tests do not give the difference between the two variables or the size of the effect. Instead, they say more about the how large the

sample was. In addition, significance testing depends on the size of the sample. The larger the sample, the chances of getting a significant result is higher.

Meta-analysis however is not without criticism. Proponents of quantitative synthesis such as Cooper (1984), Glass et al. (1981) and Jackson (1980) criticized traditional reviews for using unsystematic and poorly specified criteria for including studies and for using statistical significance as the only criterion of treatment effects. However, critics of meta-analysis such as Cook & Leviton, 1980, Eysenck 1978, Slavin, 1984) are equally justified in objecting to a mechanistic approach to literature synthesis that sacrifices most of the information contributed in the original studies and includes studies of questionable methodological quality and questionable relevance to the issue at hand. (Slavin, 1986). Slavin (1986) commented that the mis-uses of meta-analysis in education do not justify a return to traditional review procedures and proposed the "Best-Evidence Synthesis" as an alternative to Meta-analytic and Traditional reviews. The main idea behind this procedure is to add to the traditional scholarly literature review application of rational, systematic methods of selecting studies to be included and use of effect size (rather than statistical significance alone) as a common metric for treatment effects. In best-evidence synthesis, effect size data will be used as an adjunct to a full discussion of the literature being reviewed. (Slavin, 1986). In other words, the method combines the quantification of effect sizes and systematic study selection procedures of quantitative synthesis with the attention to individual studies and methodological and substantive issues typical of the best narrative reviews. (Slavin, 1986).

The review of evidence in this study will be conducted by using meta-analytic technique and making sense out of the best evidence available typical of the narrative reviews using effect size as an adjunct to a full discussion of the literature.

1.3 Statement of the Problem

The increasing number of research studies in metacognition led to an increase in the amount of empirical studies on the effect of teaching metacognitive strategies. There has been a greater diversity in research designs and outcomes due to the differences in contextual factors, length of training and the number of sessions, type of evaluation and other study characteristics. As a result, it is difficult to draw an overall conclusion with regards to the effects of teaching metacognitive strategies on reading comprehension. Due to the conflicting results, the present study will review the literature by synthesizing the results from various primary researches by using meta-analysis to assess the overall effect of metacognitive strategies and to discover the factors the might influence the treatment effects.

Meta-analysis is a new method of quantitative review defined by Glass (1976) as the analysis of analyses. Due to the staggering number of research studies in social and behavioural science there is a need for a scientifically sound review method. Glass pointed out the contemporary research reviewing should be more technical and statistical than it is narrative. Very often, narrative research reviews make no attempt at rigorous definition and standardization of techniques and the conclusions are liable to prejudice and stereotyping to a degree that would be unforgivable in primary research itself (Glass,1981). In addition, because of the changes in reviewing, Cooper (1982) commented that the researchers can no longer take the conclusions of reviews at face value and therefore research reviewers must pay the same attention to rigorous methodology that is required of primary researchers.

Most of the studies analysed in the present meta-analysis attempted to reveal how the individuals acquire or develop proficiency in reading comprehension and the

benefits of heightening students' awareness of the active role that is vital to successful reading. According to Brown et al (1984), the differences in efficient and less efficient learners are seen mainly as differences in executive functioning and these differences are open to training and to intervention. The present study examines the effects of metacognitive strategy instructions on students reading comprehension.

Previous meta-analysis on the outcomes of teaching metacognitive strategies have produced a similar effect size of 0.50 indicating the positive results on the teaching of metacognitive strategies. Individuals or different group of researchers from different academic institutions have replicated most primary research studies at various grade levels. Such research inspired the present investigations to fully explore the effects of teaching metacognitive strategies. Furthermore, due to the fact that it seems that no similar studies have been conducted in Malaysia, it would be interesting to discover if a replication or a partial replication could be carried out with a group of students in Malaysia. Then, the results could be compared with the findings from the meta-analysis.

1.4 Context of the problem

1.4.1 Current scenario in the Malaysian Educational system

The cardinal principle of Malaysia's education policy and philosophy is that the basic skills for life-long learning shall be developed in the school-going child. The three basic skills include the literary skills (reading, writing, and skills pertaining to the development of critical thinking), inquiry or research skills, and information presentation skills . Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent as well as being able to contribute to the betterment of the society and the nation at large.

The focus of the present study is on reading for understanding or reading to learn. Reading is one of the fundamental ways of acquiring information in modern society, and individuals cannot participate in a society unless they can read and by this we mean reading at a higher level of literacy .

When Malaysia launched her Multimedia Super Corridor (MSC) project, Smart school was on top priority of one of its flagships. As the ideas about the smart school being projected to the Malaysia public, there have been misconceptions and people started imagining classrooms packed with computers and all latest technologies can offer. Smart schools are not about technology in education (hardware) but about the technology of education (teaching approaches). In other words, the most important idea is about teaching and learning processes.

One of the visions of the smart school's curriculum is to foster in students the skills and attitudes of reflection, so that they are able to think critically, creatively and affirmatively to function capably in an information age. In line with this vision of a reflective learner, another input to the classroom environment outlined in the teaching learning concepts includes the metacognitive learning strategy, and generative strategies. Generally, the classroom practice will focus on inquiry, discovery, knowledge and understanding and to bring about a systemic change in education, from an exam-dominated culture to thinking and creative knowledge culture.

With the implementation of Smart school, the curriculum should emphasize the active construction of meaning, so that all students find purpose in their studies (Smart school conceptual Blueprint, 1997). Thus, the emphasis should be more on the technology of education (teaching approaches) and not just the technology in education (hardware).

This goal however cannot be achieved overnight as teachers need a gestation period to be comfortable with the new approach and culture. Teacher training is the most crucial aspect of training. There needs to be a careful mix of training and counselling to help teachers adapt to the new environment. This will be critical in order to dispel the natural insecurity and fears of redundancy that will arise from this radical paradigm shift in teaching methodology and hence the very role of teachers.

Finally, another urgent situation in the development of the Malaysian educational system is the gradual change in the examination syllabuses to accommodate the theoretical influences of the critical theory in the world of education. The change should align with the technology of education to prepare the students with the strategy, skills and knowledge to perform well in their examinations.

1.4.2 Current Reading Practices in Malaysian Schools

In Malaysia, the current instructional practice in reading instruction focuses on the mechanics of student reading in both primary and secondary school. The teachers were not well acquainted with the recent research literature. The secondary school teachers in particular did not think that student-reading difficulties were their responsibility because they perceived themselves as teachers of a specific subject and had to comply with the classroom timetable as well as the syllabus to cover for the test or examination by the end of the semester. Teaching reading is analogous to instructing students in the 'mechanics' of learning to read which they identify as instructional process belonging to the primary school, particularly the language teachers. The challenge is to convince the teachers to accept the notion that every teacher could help students learn from text.

Possessing some knowledge about how students learn from text may help the teachers especially in the secondary schools to teach their subject content more effectively. Unfortunately, most teachers still equate teaching reading with what they remember from their early schooling. Of course, at that particular era, the teachers have had little or no training in reading methodology. Reading was traditionally viewed as a decoding task that could be approached by learning rules, repetition and drilled. Consequently, it is this view of reading that isolates the business of learning to do it from the purposes and processes involved when people do it 'for real'. With this view in mind, it is not surprising that many teachers refused to accept the notion that every teacher is a reading teacher.

Alas, the responsibility for reading is usually situated within the boundary of the language department particularly the 'Malay and English' language department. For the language teachers, the teaching of reading has not been central to the department. They were not exposed to the vast amount of theoretical knowledge and its application either in the preservice or in-house training or to any publications on reading literature. As a consequence, the teachers emerging from their training will take up teaching in the same manner as their teachers would have worked when they were students. The teachers were therefore locked into approaches that are ineffective and the children were left without a clear framework for the acquisition of skills and knowledge.

There has been a common consensus among the society at large regarding the importance of reading. However, there have been no questions of how reading could be effectively used as an effective tool for the acquisition of knowledge. The different encultured views of reading have not been undertaken on any real scale. The reading programmes promote the interest for reading without specifically designed

plans to promote the serious outcomes of reading. This is due to the misconceptions and teacher ignorance with regards to the real meaning of reading. Reading is a huge topic and can mean wholly different things in different circumstances. It is not a specific quantifiable act or a collection of such acts, but the amalgam of a whole set of cultural practices, ranging from a very deliberate decoding of specific symbols to the seeking of generalised, overall impressions about the broadest topics One feature about reading is that it should be an active, meaning-making enterprise, most often undertaken with a clear purpose, whatever the context (Dean, 2000).

For most Malaysian students, reading has merely been a cognitive exercise that focuses on the learner or individual's ability to memorize a script and to acquire proficiency in decoding or pronunciation. A stereotype reading session in school or colleges would picture students reading in complete silence before their tests or examination. And very often, students believe that they understand what they have read. They have an illusion of comprehension following reading and rarely monitor their knowledge.

1.5 Research Questions

Inasmuch as the purpose of the study is to investigate the effectiveness of metacognitive strategy instructions on students reading comprehension, this study will address the following questions:

1. Is there any significant difference between student's performance in the experimental group who have been given the instruction on metacognitive strategies and the control group who have not been given the instruction?

2. Is there any relationship between motivation, strategy use, metacognition and comprehension?

1.6 Definition of terms

This section defines the key terms used in this study. The operational definitions are given for those terms that have specific meaning for the purpose of this study.

Metacognition: Metacognition refers to the awareness, knowledge and control of cognition (Brown, Bransford, Ferrara, & Campione, 1983).

Metacognitive strategies: Metacognitive strategies will be defined as strategies or sequential process that one uses to control cognitive activities, and to ensure that a cognitive goal such as comprehending a text has been achieved.

Reading comprehension: Reading comprehension is the "building bridges between the new and the known" or between the text and the reader's knowledge (Pearson and Johnson, 1978)

Metacognitive Self-regulated learning: The working definition of metacognitive self-regulated learning in this study includes students' metacognitive strategies for planning, monitoring, and modifying cognition, and the actual cognitive strategies that students use to learn, remember, and understand the material.

Modelling: A procedure in which teachers demonstrate, guide and exemplify examples of behaviours that assist the learners' understanding of what they read and acquire information. During learning, teachers verbalize their thinking to illustrate how they utilize the reading process for learning (Darvey, 1983).

Motivation: Something that "provides an impetus towards a goal for all current processes". In doing so, motivation influences the way people learn (Rheinberg, 1997,P.14)

Schema: Refers to one's background or existing knowledge, reader's concepts, beliefs, expectations, processes, or past experiences to make sense of things and actions. Within the reading context, schemas are used to make sense of the text, the printed word evoking the reader's associated experiences, and past and potential relationships .

Direct instruction: Direct instruction is an instructional approach where learning strategies were explicitly taught by modelling and explaining why, when, and how to use them. In this study, Direct or explicit instruction is defined as the instruction that emphasized explicit cues by teachers about what is going to be learned and the guided practice of the to be learned material (Dole et al., 1991). The strategy is modelled, practiced and applied to the whole comprehension task without any assumption that the strategy will be broken down into componential sub skills. There is no feedback about the correctness of applying a particular strategy; rather the adaptability and flexibility of strategies are emphasized (Pearson & Dole, 1987).

Reciprocal teaching. Reciprocal teaching refers to a set of learning conditions in which children "first experience a particular set of cognitive activities in the presence of experts, and only gradually come to perform these functions by themselves" (Brown&Palincsar, 1989).

Generative learning. In generative learning, the students were taught how to generate meaning from text using their background knowledge and strategies for relating elements of the text to one another and to their experience. (Wittrock, 1991). The teaching of the generative processes of learning involves students' preconceptions, knowledge and perceptions; motivation; and attention.

Meta-analysis: Meta-analysis is a new and innovative method for reviewing research in social and behavioural sciences. Glass (1976) defined it as "analysis of

analyses" with the purpose of integrating the findings of individual primary research studies through rigorous statistical analyses to draw an overall conclusion about the research effort. Via meta-analyses, the individual studies was synthesized by using effect size as the representation of the outcome. The effect size is obtained through dividing the difference between the mean of the treatment group and the mean of the control group by the standard deviation of the control group (Glassian method) or pooled standard deviation (Hedges and Olkin, 1985).

1.7 Meta-analysis and the Alternative approach

Since the analysis of the previous research was conducted using meta-analytic techniques, a brief discussion of meta-analysis would help us understand the nature and features of the techniques. The definition of meta-analysis was described earlier in the previous section on the definitions of terms in this chapter. Meta-analysis as described by Glass (1976) and Cohen (2000) is simply the analysis of other analyses involving the aggregation of results of other studies into a coherent account. Most researchers concur that the presidential address of the American Educational Research Association (AERA) by Glass in 1976 marked the beginning of new stage in scientific research and gave " quantitative review a mass and an identity" (Kulik & Kulik, 1988, P.10). Glass (1976) emphasized the importance of meta-analytic research after making a distinction among three types of research studies; primary, secondary, and meta-analysis. Primary studies are data-analyses of original experiments and field studies; secondary studies are re-analyses of data from primary studies; and meta-analysis combine results and data from many primary studies to draw overall conclusions and reveal patterns.

Since Glass's 1976 AERA presidential address and the meta-analytic syntheses of research in both education and psychology, many studies on meta-analysis and quantitative research synthesis have been conducted and published in books, journals, and dissertations in the field of education. Several other researchers and meta-analysts come up with variety of techniques and approaches in the field of research synthesis. Bangert-Drowns (1985) claimed at least five coherent approaches to meta-analysis; firstly the meta-analysis used to approximate data pooling, answering the same questions as in primary research. There are three approaches in the first group, whereas the two approaches will be in the second group. The first group includes the approaches devised by Rosenthal (1976, 1978, 1984), Hedges and Olkin (1980, 1982), and Hunter, Schmidt, Jackson (1983). Rosenthal's approach is to average effect sizes from all studies and calculated combined probability. A variation in study findings is not explained. Hedges and Olkin's (1985) approach is to apply test of homogeneity to effect sizes and study relationships between study features and effect sizes. According to Bangert-Drowns, (1985), the test of homogeneity in the approach can be too sensitive sometimes, showing statistical significance for unimportant differences among effect sizes. The third approach by Hunter, Schmidth, and Jackson is to subtract from overall variance of the effect sizes outcome variance attributable to sampling error and to search for intervening variables when the remaining variance is large. The second group consists of two approaches where meta-analysis is used as a form of research synthesis to summarize features and outcomes from a large body of primary studies. The first approach by Glass (1976, Glass, McGaw & Smith, 1981) and the second approach by Kulik & Kulik (1979). Both approaches used effect size as a simple data point and apply familiar statistical test to effect size. The differences between these two approaches include the study

inclusion decisions, calculation of effect size from every dependent variable and combining different kinds of dependent variables.

Meta-analysis as a quantitative reviewing of primary studies is an effective and scientific way to summarize research findings from a large body of literature, because it is often possible to reach stronger conclusions as more studies can be analysed with statistical methods than in impressionistic literature review (Wolf, 1986). Glass et al., (1981) stated,

> The approach to research integration referred to as "meta analysis" is nothing more than the attitude of data analysis applied quantitative summaries of individual experiment. By recording the properties of studies and their findings in quantitative terms, the meta analysis of research invites one who would integrate numerous and diverse finding to apply the full power of statistical methods to the task. Thus it is not a technique; rather it is a perspective that uses many techniques of, measurement and statistical analysis (P.21).

Citing Fitz-Gibbon (1985), meta-analysis had given ways to make small-scale experiments valuable:

> -Humble, small-scale reports that have simply been gathering dust may now become useful,
> -. Small scale research conducted by individual students and lecturers will be valuable since meta-analysis provides a way of coordinating results analysis provides a way of coordinating results drawn from many studies without having to coordinate the studies themselves
> -For historians, a whole new genre of studies is created, the study of how effect sizes vary over time, relating this to historical changes.

In the explication of meta-analysis (1984), Fitz-Gibbon criticised significance testing as depending heavily on sample size and stated that to examine the *magnitude*

of the effect is far more important than discussing the statistical significance. Significance testing therefore left out the most important information; the size of the effect.

An essential feature in meta-analysis is the use of effect size as a means of synthesizing research findings (Fitz-Gibbon, 1984). Glass defined an effect size using the formula:

$$\textbf{Effect size(Es)} = \frac{\textbf{experimental mean (x) – control mean (x)}}{\textbf{Standard deviation of control group}}$$

The advantage of translating the different between experimental and control groups into this metric is that the effect sizes can be compared across studies that use vastly different dependent measure. Furthermore, the advantage of an effect size metric is that it is standard deviation units and can be interpretated as a change in the percentile ranking of the "average" size in the experimental group (Marzano, 1998). For example, if the mean score of the subjects in the experimental group is .50 standard deviation above the mean of subjects in the experimental groups. The average student in the experimental group is at the 69^{th} percentile of the control group- an increase of 19 percentile points.

For the purpose of this meta-analysis, the computation of effect sizes from reported statistics such as *means and standard deviation* involves the following formula;

$$ES = \frac{\textit{(Mean of Experimental /treatment group)-(Mean of Control/comparison group)}}{\textit{Pooled standard deviation}}$$

Fitz-Gibbon (1984), described the four steps in meta-analysis: The first step require the researcher to locate different studies like dissertation, theses, published work and previous reviews related to the domain of interest. In the second step, the researcher has to code the study characteristics such as the publication status, details of design, or other variables that might influence the effects. Thirdly, the researcher has to measure effect sizes: essentially the effect size by locating the E group mean as a z score in the control group distributions. Finally, the effect sizes have to be correlated with context variables: the data are explored to see if there are any relationships between the Effect sizes and the contexts in which the effects were found.

1.7.1 The Best-Evidence Synthesis: The alternative approach?

The Best-Evidence Synthesis approach was proposed by Slavin (1986) as an alternative to both meta-analytic and traditional reviews. The procedure is designed to draw on the strengths of each approach and avoid the pitfalls characteristics of each.

Best evidence syntheses focus on the "best evidence" in a field, the studies highest in internal and external validity. If the literature contains several studies, high in internal and external validity, then lower quality studies might be largely excluded from the review. For example, if we have a literature of 10 randomised studies of several months' duration evaluating treatment X, in this case, results of correlational studies, small-sample studies, and/or brief experiments might be excluded or at most briefly mentioned. (Slavin, 1986).

The "Best Evidence" synthesis proposed by Slavin (1986) also differs from the exhaustive inclusion principle suggested by Glass et al. (1981) in terms of the well

justified, clearly stated priori inclusion criteria which is at the heart of the best evidence synthesis. Slavin (1986) put down a few principles or criteria that probably apply generally for including studies;

> First, the most important principle of inclusion must be germaneness to the issue at hand. For example, a meta-analysis focusing on school achievement as a dependent measure must explicitly describe what is meant by school achievement on individual assessment……Secondly, methodological adequacy of studies must be evaluated primarily on the basis of the extent to which the study design minimized bias. For example, it would probably be inappropriate to exclude studies because they failed to document the reliability of their measures, as unreliability of measures is unlikely in itself to bias a study's results in favour of the experimental or control group. On the other hand, great caution must be exercised in areas of research in which less-than ideal research designs tend to produce systematic bias……Thirdly, it is important to note that external validity should be valued at least as highly as internal validity in selecting studies for a best- evidence synthesis. For example, reviews of classroom practices should not generally include extremely brief laboratory studies or other highly artificial experiments. One category of studies that may be excluded in some literatures is studies with very small samples. Small samples are generally susceptible to unstable effects. ……Finally, it may be important in some literatures to mention the best-designed studies excluded from the review (that is, those that "just missed") to give the reader a more concrete idea of why a study was excluded and what the consequences of that exclusion are. (Pg.7-8)

Once the criteria have been established, the reviewer would try to locate every study that meets these criteria. The effect sizes should be computed as suggested by Glass et al. (1981), with a correction for sample sizes devised by Hedges (1981; Hedges & Olkin, 1985) to produce an unbiased estimate of an effect size. Since there are many studies reporting a large number of effects, averages of some effect sizes across particular subsets of comparisons were computed. So, the amount of averaging depends on the purpose and focus of the best evidence synthesis. When there are many studies high in internal and external validity on a well-defined topic, pooling (averaging) effect sizes across the various studies may be done by computing a median across the number of studies being pooled. Slavin (1986) suggested that when

the effects are diverse, or the number of methodologically adequate, germane articles is small, pooling should not be done.

Even though Slavin stated that there are no formal guidelines for conducting a literature review in a best evidence synthesis, he suggested a general format for presenting the literature being reviewed. The introduction to the best-evidence synthesis will closely resemble the introduction in traditional narrative reviews. The area being studied is introduced, key terms and concepts are defined, and the previous literature, particularly earlier reviews and meta-analysis is discussed. In the method section, criteria for the inclusion of study in the review and the literature search were described in detail. The real meat of the best evidence synthesis as described by Slavin (1986) would be in the literature synthesis section where the research evidence is actually reviewed. This section would first present and discuss the table of study characteristics and effect sizes and the results of any pooling, or the results for not pooling. In the literature synthesis, this is simply a point of departure for an intelligent, critical examination of the literature. The evidences will be given to answer important questions about the effects of various treatments, possible conditioning or mediating variables, and so forth.

Generally, according to Slavin (1986) the "best evidence" studies should be described with particular attention to studies with outstanding features, unusually high or low effect sizes or important additional data. Studies that do not yield effect size data would be discussed on the same basis as those that do yield effect size data. Studies excluded from the main synthesis may be brought in to provide evidence on a secondary issue. Except for the references to effect sizes, the bulk of the literature synthesis should look much like the main body of any narrative review.

In this study, a meta-analysis was conducted to review the evidence on the effects of metacognitive strategies on reading comprehension. The effect sizes were not strongly homogeneous and additional analyses were executed to explore the possible causes of excess variation. The discussion of the available evidence from the meta-analysis and the literature would be partially similar to that of the traditional narrative review and the guidelines provided by Slavin (1986) where some of the studies excluded from the main synthesis may be brought in to provide evidence on a secondary issue. Briefly, the review method used in this research combines the elements of meta-analysis with those of narrative reviews.

1.8 Organization of the Thesis

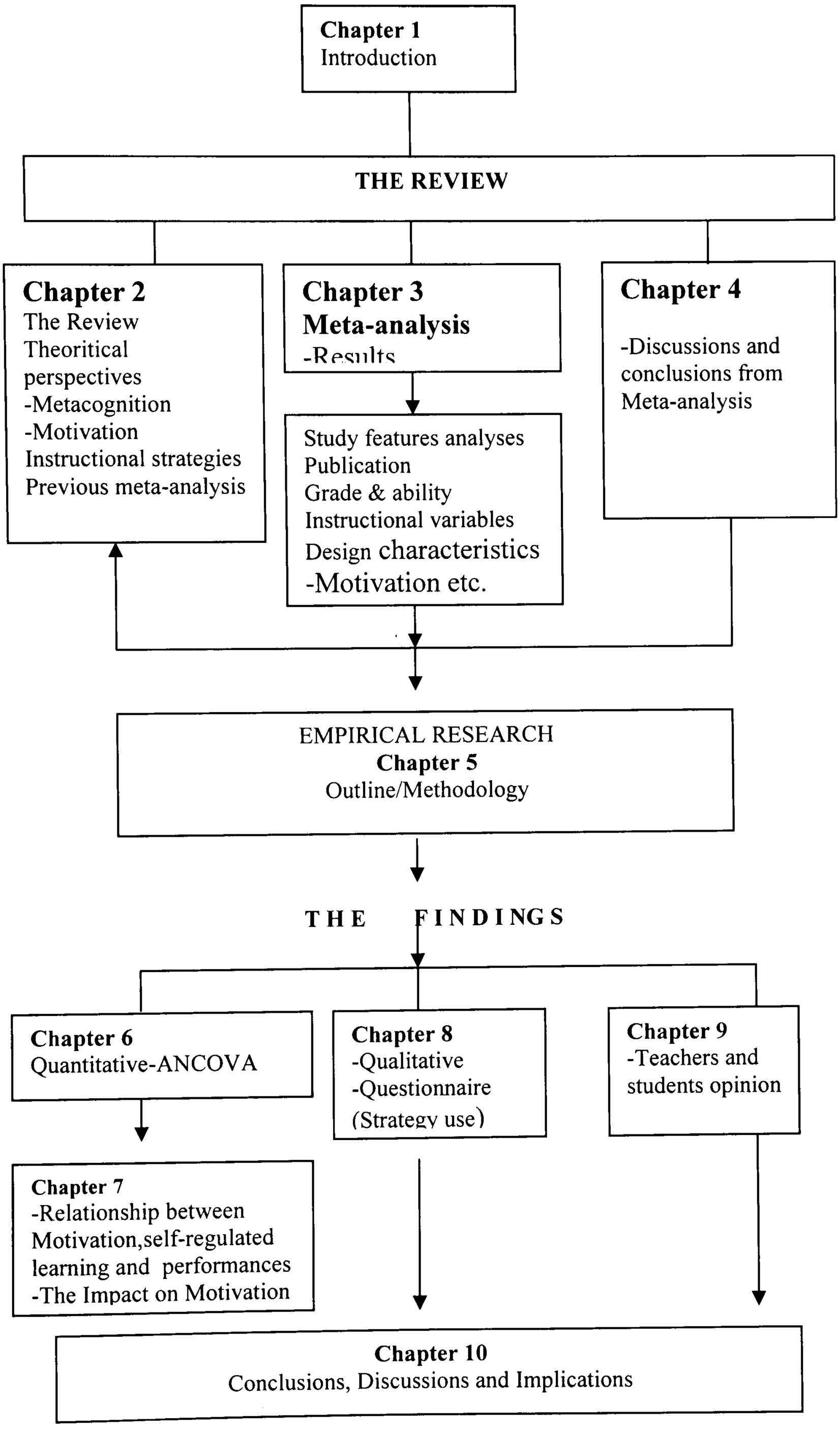
This section will briefly outline the organization of thesis. The chapters could be divided into four groups. The first group consist of the introductory chapter 1. The second group consists of the reviews for the whole research that were divided into three chapters (Chapter 2, 3, 4) –See chart 1 (The research Framework/Organization of dissertation). The third component of the dissertation consists of chapters on the Empirical research (Chapter 5, 6, 7, 8, 9). Finally, chapter 10 will discuss the conclusion, discussions and implication drawn from the research.

In chapter two: theoretical perspectives of reading literature such as the theory of Metacognition, its historical and contemporary contexts, other theories and factors effecting reading comprehension such as text structure and the developmental factor such as age/ability were discussed. The issue of motivation as identified in the meta-analysis and the strategies used in the intervention were included in this chapter to provide a better understanding on the framework of the empirical research.

The meta-analysis and the results were reported in chapter three whereas the chapter four presented the discussion and conclusions from the meta-analysis.

Chapter five outlined the procedures and methodology involves in the investigation and in chapter six (ANCOVA) and seven (Correlational analysis), the results from the quantitative data were reported. Further analysis of the qualitative data from the Strategy use questionnaires response was reported in Chapter eight and the teachers' and students' opinion were reflected in chapter Nine. The conclusions, discussions and implication of the research were discussed in chapter 10.

Chart 1


Chapter 1
Introduction
THE REVIEW
Chapter 2
The Review
Theoritical
perspectives
-Metacognition
-Motivation
Instructional strategies
Previous meta-analysis
Chapter 3
Meta-analysis
-Results
Study features analyses
Publication
Grade & ability
Instructional variables
Design characteristics
-Motivation etc.
Chapter 4
-Discussions and
conclusions from
Meta-analysis
EMPIRICAL RESEARCH
Chapter 5
Outline/Methodology
THE FINDINGS
Chapter 6
Quantitative-ANCOVA
Chapter 8
-Qualitative
-Questionnaire
(Strategy use)
Chapter 9
-Teachers and
students opinion
Chapter 7
-Relationship between
Motivation,self-regulated
learning and performances
-The Impact on Motivation
Chapter 10
Conclusions, Discussions and Implications

CHAPTER TWO

Review of Relevant Literature

Theoretical perspectives, Instructional strategies and Previous Meta-analysis

2.0 Introduction

This chapter will begin with the discussion of the theoretical perspectives of the literature on reading. These include the historical and contemporary contexts of "metacognition", followed by the theoretical and measurement issues surrounding the research on metacognition, and the re-evaluation of the role and theoretical base of comprehension strategies which resulted in the incorporation of affective components along with the cognitive and metacognitive strategies

Therefore, in the second section, the concept of motivation and its relationships with metacognition, and self-regulated learning were elaborated. These affective components were included in this chapter after the variable on motivation was identified from the meta-analysis. (See Chart 1 in the introductory chapter).

The discussion on the motivational constructs is therefore inevitable in the second section. 'Motivated Strategies of Learning Questionnaire' (MSLQ) was used for the purpose of measuring the relationship between motivation, self-regulatory strategies and student's performance in the empirical investigation. Theories of learning such as motivation and metacognition to improve performance in reading comprehension were referred and reviewed to see if the results are in accordance with these assumptions.

The third section will discuss the literature on the use of various cognitive and metacognitive strategies, followed by section four on metacognitive instructions, section five on Evidence base and section six on the Previous Meta-analysis. These sections will provide the definition of various metacognitive strategies and instructions, and evidences of its use in the literature. The discussion will not only involve studies included in meta-analysis accompanied by the calculated effect sizes but also studies not included in the meta-analysis due to insufficient data or studies conducted before 1980s. Finally, the previous meta-analytic studies were also included in this chapter as a basis of comparison with the current study.

2.1 . Theoretical Perspectives on reading literature

2.1.1. Historical and contemporary contexts

This study was guided by the theoretical and conceptual framework of metacognition. The term metacognition was not introduced until 1976 even though the history of metacognition or learners thinking about their own thinking dated back to at least during Plato and Aristotle (Brown, 1987) and in the earlier works by Dewey and Thorndike (Brown, 1987). The relation between metacognition and reading received substantial interest in the late 1970s with considerable theoretical and empirical interest in the 1980s in the area of psychology and education. It was in 1977 that Flavell and Wellman proposed a theory of metamemory to explain young children's development and application of recall strategies. Flavell and wellman hypothesized that it was due to the lack of awareness of parameters that govern effective recall that might explain the children's failure to apply strategies for recalling information. Consequently, Flavell concluded that the failure to recall resulted from a deficiency in metamemory.

In the 1980s, metacognitive theory was applied to reading. Brown (1980) differentiated between metacognitive and cognitive processes, the former as reader-controlled strategies that included selecting and studying the most important part of text, selecting retrieval cues, and estimating readiness for tests. In the late 1980s, formalized theories of metacognition were advocated. These theories differed as a function of researchers' understanding of metacognitive components and the role of 'Awareness', 'regulation' and 'motivation'. Researchers such as Borkowski, Johnston, and Reid (Brown, 1987) focused on motivation and the retraining of students' attributional beliefs about success from external control (e.g., luck, teacher, ease of task) to self (e.g. value of using a strategy) (cited in Collins et al., 1995), whereas Paris, Wasik & Turner (1991) recognises not only the role of self-regulation and motivation in metacognition but also self-awareness and self-efficacy. On the other hand, Zimmerman (1994) noted the importance of motivation and self-efficacy to self-regulation and at the same time self-regulation differentiates between academic success and failure. Following this, most research and practice in reading comprehension emphasizes on integrating metacognition, motivation and strategies to develop thoughtful readers, who plan, monitor comprehension while reading and reflect on process and content after reading.

Overall, the history of research in metacognition in learning reflects the move of emphasis from metacognitive knowledge to the role of metacognitive experiences or the relationship between metacognition and affect, knowledge and strategy use. No matter which direction or emphasis of the research is concerning to the area of thinking about reading, there is a general agreement among researchers and practitioners that metacognition is an important dimension that enables readers to

coordinate and regulate deliberate efforts at efficient reading effective studying (Baker and Brown, 1984) and therefore enhances reading comprehension.

21.2. Definition of metacognition

Generally, metacognition refers to thinking about one's own thinking and controlling one's own learning. It is one of the methodologies that has been proposed and researched in recognition of the need for better reading comprehension.

According to Flavell (1979), metacognition consists of metacognitive knowledge and metacognitive experiences or regulation. Metacognitive knowledge refers to acquired knowledge about cognitive processes, knowledge that can be used to control cognitive processes. The taxonomy of metacognitive knowledge consists of two main categories: sensitivity and the three variables namely person variables, task variables and strategy variables. Sensitivity is variously referred to as feeling, sensing, sense of, or being attuned to situational demands (Fisher and Mandl, 1984). Fischer pointed out that sensitivity is a hybrid of actually experiencing a processing demand and knowledge-dependent learning from earlier experience with a task similar to the current one. According to Flavell and Wellman (1977),

> "The child comes to learn which situations do and which situations do not call for intentional memory-related behaviour… (He may learn) to be attuned to and responsive to those occasions, when it is adaptive either to try to retrieve something right now, or to prepare himself and/or his environment for effective future retrieval, for example deliberately try to store or memorize it".
>
> (Cited in Mandl et al., 1984)

On the other hand, knowledge of person variables refers to general knowledge about how human beings learn and process information, as well as individual knowledge of one's own learning processes (Livingston, 1997). In other words, the person variable includes one's abilities and limitations in undertaking a cognitive activity and of one's ability to monitor or assess the activity one's is pursuing.

Knowledge of task variables includes knowledge about the nature of the task as well as the type of processing demands that it will place upon the individual (Livingston, 1997). An individual has to understand the demands for a particular task to accomplish the task effectively.

Finally, knowledge about strategy variables includes knowledge about cognitive and metacognitive strategies as well as conditional knowledge about when and where it is appropriate to use such strategies (Livingston, 1997). A person has to decide which appropriate monitoring strategies to use when facing a task. It's the interaction of these three variables that plays a significant role on the processes and outcomes of one's cognitive activity. However, within the context of reading to learn, Brown et al. (1986) added a fourth variable of text. The text characteristics such as the text structure that includes coherence, structuredness, explicitness vs. implicitness, the text abstractness and concreteness, the clarity of presentation of content and even the topic interest are all the essential components of knowledge that may influence the reading comprehension.

From the statement made by Flavell (1979), Baker and Brown (1984) identified two (not necessarily independent) clusters of activities: knowledge about cognition and regulation of cognition. The first cluster is concerned with a person's knowledge about his or her own cognitive resources and the compatibility between the person as a learner and the learning situation (Baker and Brown, 1984). For example, a person or a child would know about certain pertinent features of thinking, including themselves as thinkers if interrogated properly. However, according to Baker and Brown (1984),

> The ability to reflect on one's own cognitive processes, to be aware of one's own activities while reading, solving problems, and so on, is a late-developing skill with important implications for the child's effectiveness as an active, planful learner. If the child is aware of what is needed to perform effectively,

> then it is possible for him or her to take steps to meet the demands of a learning situation more adequately. If, however, the child is not aware of his or her own limitations as a learner or the complexity of the task at hand, then the child can hardly be expected to take preventive actions in order to anticipate or recover from problems. (P.353)

The second cluster of activities studied under the heading "metacognition" defined by Flavell (1979) consists of the self-regulatory mechanisms used by an active learner during an ongoing attempt to solve problems. These indexes of metacognition include checking the outcome of any attempt to solve the problem, planning one's next move, monitoring the effectiveness of any attempted action and testing, revising and evaluating one's strategies for learning. However, the strategies used by learner vary, depending on the goal of the activity; for example, reading for meaning demands different skills than reading for remembering (studying).

For reading metacognition, the knowledge component includes knowledge or awareness of (a) self as a learner; (b) task demands; and (c) relations between text, prior knowledge, and reading strategies and reading comprehension. Self-regulation includes (a) coordinating metacognitive knowledge such as self-knowledge and knowledge of text organization, (b) planning, (c) monitoring understanding, and (d) identifying and remediating causes of comprehension failures. Although the metacognitive components of knowledge and self-regulation can be distinguished from each other, Brown (1987) suggested that attempts to separate components might lead to "oversimplification" of a complex process.

Finally, there is a general consensus among researchers regarding metacognition that includes knowledge and self-regulating components with motivation as a third component. In the earlier stage, most interventions stressed the role of metacognitive knowledge of strategies, a traditional way of looking at metacognition in the learning processes. Research on another facet of metacognition,

metacognitive experiences that comprise online feelings (feelings of knowing, familiarity, difficulty, confidence), judgments or estimates, (judgment of learning, of where, when and how to acquire information, of time and effort spent on task) and metacognitive knowledge regarding cognitive processing were only recent. Flavell defined metacogntive experiences as conscious experiences that are cognitive and affective (cited in Brown, 1987). Metacognitive experiences not only serve the monitoring and control of the learning process but also the intrinsic context within which learning process take place. This facet of metacognition is to a large extent affective that might influences students' strategy use, emotions or future motivation towards learning. Researchers such as Borkowski (1992) and Swanson (1989) considered motivation as a third component of metacognition.

2.1.3 The definitional vagaries of metacognition

As a fairly new construct, most researchers, educators and psychologists disagree on the range of knowledge and activities classified as metacognitive. The term metacognition has been used as a "blanket term" (Brown, 1987) covering a multifaceted range of interventions varying widely in scope, purpose, and dimension; First of all, it is conceptually and methodologically challenging to distinguish "meta" from "cognitive" (Borkowski, 1992; Brown, 1987), and therefore making it difficult to distinguish metacognitive reading strategies from other reading processes such as thinking, reasoning, and perceiving. Second, reading strategies once considered cognitive are now considered metacognitive. For example, metacognitive reading skills that include the following activities (previously dignified with the title of mere strategies); (a) establishing the purpose for reading; (b) modifying reading due to variations in purpose; (c) identifying important ideas; (d) activating prior knowledge;

(e) evaluating text for clarity, completeness, and consistency; (f) compensating for failure to understand text; and (g) assessing one's level of comprehension. (Baker & Brown, cited in Brown, 1987). Which of these activities should be deemed cognitive or which components of these complex activities is "meta" remains unclear. However, Brown et al. (1984) argued that these activities appear as academic tasks in their own right. The students will make sense of the instruction through these academic tasks. Like other cognitive activities, a reader must have a purpose that will determine what needs to be considered and planned in successive activities. For example, if the purpose of reading is to state the meaning of text content, that goal has to be set and appropriate strategies such as self-directed questioning of an interpretative and predictive nature will be selected. The reader had to select an appropriate strategy depending on the academic task. Similarly, if the intent of reading is to monitor and check their understanding while reading the text, self-directed summarization technique could be an appropriate strategy to be used. However, when setting up the goal, the reader also has to consider the demand for the task in relation to his or her limitations (Fan, 1993).

The third source of confusion and difficulty arise in distinguishing "meta" from "cognitive" is the interchangeability in the function of reading activities. For example, in the area of reading comprehension: "Asking yourself questions about the chapter might function either to improve your knowledge (a cognitive function) or to monitor it (a metacognitive function)" (Flavell, cited in Brown, 1987, p. 66).

Fourthly, "meta" and "cognitive" may be difficult to distinguish because reading strategies are embedded in complex behavioural sequences and decision hierarchies, making the components problematic to demarcate (Paris et al., 1991).

Finally, the difficult distinction between "meta" and "cognitive" may be the result of varying developmental influences on strategy application. Metacognition develops slowly over time, well into the teen-age years.

The issues regarding the separability of cognition from metacognition results in difficulties to identify strategies that are cognitive and which are metacognitive. According to Sternberg's triarchic theory of intelligence (1985), metacognition was defined, as "higher order executive processes used to plan what one will do, to monitor one's performance throughout the task, and to evaluate the results" whereas the cognitive variable includes the "knowledge-acquisition components involving processes used in gaining new knowledge". The three processes within the cognitive components are; (1) selective encoding that involves sifting out of relevant from irrelevant information, (2) selective combination where the selectively encoded information were combined to form an integrated, plausible whole and (3) selective comparison that involves relating newly acquired information to information acquired in the past.

Even though each of the components such as metacognitive knowledge, self-regulated components and motivation can be distinguished from each other, the three components were reunited to examine the effects of metacognitive instructions in facilitating reading comprehension. For the purpose of synthesis in this research, metacognition components interventions included various combinations of metacognitive knowledge, self-regulation, and/or motivation. Some contained one component; others included several. Studies were categorized by attending to the authors' descriptions of interventions in the study and the fit between their respective descriptions and definitions of metacognitive knowledge and self-regulation.

Beside the operationally defined metacognition as knowledge and self-regulation of one's own learning processes, and motivation as a third component, two categories of strategies were defined for this synthesis, cognitive and metacognitive strategies. Metacognitive strategies or metacognitive regulation are sequential process that one uses to control cognitive activities, and to ensure that a cognitive goal such as comprehending a text has been achieved. This process that consists of planning and monitoring cognitive activities as well as checking the outcomes of those activities (Livingston, 1997) helps to regulate and oversee learning.

While metacognitive strategies are used to ensure that the goal has been reached, cognitive strategies are used to help an individual achieve a particular goal. Borrowing the definition of Paris et al (1991), cognitive strategies is a broad array of learner-based actions that help control attention, behaviour, communication and emotions. And within the context of reading, metacognitive reading strategies help readers' awareness of whether or not they comprehend what they are reading, and assist readers' decision of what strategies to employ to aid comprehension

21.4. Measurement

There are variations in methods used to examine awareness of comprehension and metacognitive strategies used by good and poor readers, average, younger and older readers and foreign language learners. Different research methods and instruments were used for data collection to verify previous findings and provide new evidence. In addition to self-report, questionnaires and interviews, other research methods include summary protocols, cloze procedure and verbal reports.

In the case of retrospective self-reports (i.e., reporting one's thinking processes and strategies after-the-fact), adults, as well as young children, may have

difficulty reporting their thinking processes, therefore making self-report an inconsistent measure (Ericsson & Simon; Nisbet & Wilson; Smith & Miller; White; cited in Brown, 1987). There is a probability that younger children may reconstruct past events inaccurately and modify observations of their thought processes. Furthermore, self-talk and retrospective self-reports are problematic because skilled readers perform tasks automatically and are unlikely to think about underlying metacognitive processes. In addition, students with learning disabilities may not possess the language skills to report their metacognitive processes (Billingsley & Wildman; cited in Collins et al, 1995). Another commonly used method to elicit self-talks, self-reports, and students' strategy use was the questionnaire. The questions asked might be quite general which invite responses based on prior experiences and knowledge of how a task ought to be performed, rather than responses to the specific situation. These are least likely to elicit responses closely linked to the cognitive processes under discussion (Ericsson & Simon, cited in Brown, 1987). More valid information can be obtained by presenting students with actual passages containing embedded main ideas and asking them to describe specific steps they use to identify main ideas.

Summary protocols are another research methods that have been widely used as a basis for researchers to examine the quality of summary writing of both first and second language users. Summaries written by subjects provide the data for analysis. To make inferences about subjects' knowledge of strategy use, the researchers usually use cloze procedure. Cloze procedure uses a prose where some of the words are deleted for the students to fill in.

Finally, two categories of verbal reports were used. Firstly, an interview approach, where the researchers prepared either structured questions or open-ended

questions for their subjects to gather information on their subjects' knowledge and use of metacognitive strategies. The second category is a think-aloud approach, which requires subjects to report on their thoughts or strategy use as they read. It attempts to infer strategy used during the process of cognitive activities. Questions are usually presented to subjects at the preset locations in the text, and the reports are often tape recorded before being transcribed, analysed to make inferences about the comprehension process.

New fields of study such as metacognition are ripe for investigation but the definitional, theoretical and measurement issues surrounding this area of research suggest caution in interpreting findings. Therefore, components and measures of studies designated as metacognitive require close analysis prior to drawing conclusions regarding implications for learners from different ability group.

2.1.5 Theories and factors effecting reading comprehension

(i) Information processing paradigm

There is a general agreement that metacognition derives from an information-processing paradigm. Instruction within the information-processing paradigm emphasizes teaching cognitive and metacognitive processes in an academic context such as reading comprehension (Wong, 1992). Furthermore, research supports the benefit of such instruction for students with reading comprehension difficulties (e.g., Paris et al., 1991; Schunk & Rice, 1992). Within the information-processing paradigm, questions concerning executive control, automatic and controlled processes are central to the metacognitive construct though these issues were not explicitly addressed in the reviewed studies. The discussions might provide the reasons for the

need of training and intervention to improve learners' efficiency in reading comprehension.

According to Brown's executive model (1978), the person is a master of general knowledge about the world and the self as a person and as a thinker. Much of the general knowledge is schooled, learned knowledge and skills; the executive routines are learner dependent, stemming from learning to learn experiences of the learner. The executive routines govern the process of thinking by selecting the relevant knowledge and action when needed, supervise and control the flow of action. The differences in the static knowledge base explain the differences in learning efficiency and thus, the differences in efficient and less efficient learners are seen mainly as difference in executive functioning. These differences are however open to training and to intervention. According to Brown (1987), activities that were once effortful, when opened for extensive training and experience have become automatic. It's the central role of executive monitoring and control naturally that leads to a less prominent role of knowledge (Fischer and Mandl, 1984). Consider an example given by Brown (1987) on skilled reading. The skilled reader can operate with a lazy automatic processor. Cognitive activities that once were laborious and slow have, with practice, become automatic and rapid; they require little attention. The skilled reader's top down and bottom-up processes are so fluent that he or she can proceed merrily on automatic pilot until alerted to a comprehension failure by some triggering event. If the process is flowing smoothly, construction of meaning is very rapid, however when a comprehension failure is detected, the reader must slow down, and allot extra processing capacity to the problem area. The reader must employ debugging devices and strategies, which take time and effort. The difference in time and effort between the normal rapid automatic pilot state and the laborious activity in

the debugging state is the difference between automatic and controlled processing. Whatever the nature of the triggering event, one reacts by slowing down the rate of processing allocating time and effort to the task of clearing up the comprehension failure. In the process of disambiguation and clarification, the individual enters a controlled, deliberate, planful, strategic state that is quite distinct from the automatic.

Based on the above example, it seems that Brown's control of thinking does not seem to happen consciously at all. Ordinarily, thinking proceeds along routinized paths, automatic and self-acting until a problem arises. On the other hand, Flavell's approach centres on the dominant role of highly conscious deliberate self-attention by the thinker. Training in behaving strategically, is arranged by expansion of consciousness (Fischer and Mandl, 1984). Only then, the actions and the relevant tasks are planned and executed in a stepwise manner. Later, the individual would be able to sense some state of heighten consciousness.

It is the issue of whether or not humans have conscious access and control of their mental functions that has important implications for teaching metacognition. However, one area of disagreement is whether access and control are tied to processes linked to specific situations or to processes used over a wide range of conditions (Brown, 1987). For example, if access and control are linked to specific situations, researchers and practitioners may be required to vary instruction according to whether the reading text is narrative or expository. If access and control are linked to processes used over a wide range of conditions, it may be sufficient to provide metacognitive instruction on narrative text and expect a transfer to expository text through varied types of practice rather than new instructional sequences.

Another theoretical difference that exists concerning human control of mental functions is the issue of other- versus self-control of learning, which directly affects

the emphasis, and sequence of metacognitive instruction. The theory of other-control is based on the Vygotskian notion that a great deal of learning is fostered by the activity of others such as parents, teachers, and peers. Through systematic support from others, social activity becomes personalized and internalized as a child develops. In contrast, self-regulation derives primarily from the work of Piaget and asserts that human learning takes place in the absence of external agents and that active learning involves continuous adjustments and "fine-tuning of action via self-regulating processes" (Brown, 1987, p. 88).

Related to the issue of other- versus self-control of learning is the question of whether effective, long-lasting benefits of metacognitive instruction are a result of direct instruction or instruction that induces metacognition indirectly. It is not difficult to envision how these theoretical differences translate into disparate methods of instruction all designed to promote metacognition. The difference in the role of control appears central to instructional interpretations. For example, in instruction designed to induce metacognition, the teacher may directly teach a cognitive strategy such as summarizing. Acquisition of the metacognitive dimension, however, would rely more on student control. In contrast, the teacher plays a strong initial role directly teaching awareness knowledge or self-regulation in direct metacognitive instruction. For example, the teacher might teach the importance of a strategy, where and when to use the strategy, or how to self-monitor strategy use, rather than leaving students to induce this information on their own.

(ii) Active processing perspective

An active comprehender and an independent thinker generate questions as an effective tool to guide and focus their thinking and understanding. In the review of

the self-questioning approach, Wong (1985) claimed that the majority of self questioning studies emerged from the active processing theoretical perspective but most researchers neglect conceptual clarity regarding students' active processing of prose. In explaining the psychological processes involved when the students engaged in processing the prose, Wong extrapolated some useful pointers from Cook and Mayers (1983).

> The four encoding processes are; selections, acquisition, construction and integration. Selection basically refers to "the process of selective attention". Acquisition refers to the "processes of transferring information from attention to long-term memory." Construction refers to establishing internal connections among ideas learned from the text. Integration is " locating relevant existing knowledge and building external connection between that knowledge and ideas acquired from the passage.

Cook and Mayer further suggest that the encoding processes may serve as goals of various reading strategies (Wong, 1985). Thus, the straightforward instructional implications from the active processing perspectives are such that the; (a) the student-generated questions should induce prose processing superior to experimenter – generated questions; (b) generation of higher order questions would produce better comprehension because higher order questions are presumed to induce more processing of prose in students, which in turn would result in better comprehension and retention (Wong, 1985).

(iii). Models of reading

The question of what reading with comprehension is a far more complex process than had been envisioned by the early researchers. Several models have been developed based on the cognitive theory and models of learning as described briefly, in the earlier sections through Flavell's approach and that of Brown and the

colleagues. These models can be grouped into four basic categories: bottom up, top-down, interactive and executive control (Adam,1980; Spiro & Myers, 1984).

The bottom-up view of reading emphasizes on text-based aspects of reading where the readers go through a series of stages from smaller units of analysis in text to larger ones (LaBerge & Samuels, 1974). According to this model, the readers initially detected features of letters, followed by words, sentences and finally, connected discourse.

The top-down processing in reading counters the bottom-up view of reading with emphasis on existing knowledge or schema and contextual factors In other words, this view of reading is the result of constructive processing on part of the reader in the construction of the meaning in the text based on textual information and partly on contextual factors (Anderson, 1983).

The interactive model of reading is the interaction of both bottom up and top-down processing. Both processes may influence, interfere and facilitate the other depending on the amount of resources each type of processing requires (Rumelhart & Norman, 1978; Stanovich, 1980). In this interactive model, the interacting processes shared a total system of limited capacity.

Executive control theories as explained in the above section focus on processes that direct and manage the various interactions involved in reading. The theories concerned with assessing and the evaluation on how to approach a reading task and adequacy with which the plan was executed (Brown, 1980). Most of the studies analysed in the meta-analysis attempted to reveal how the individuals acquire or develop proficiency in the processes involved in the above models. The differences in efficient and less efficient learners are seen mainly as differences in

executive functioning and these differences are open to training and to intervention (Brown, 1980).

(iv) Schema theory

This theory is concerned with the influence of previous knowledge on learning and serves as a set of expectations that determine not only how and what information is encoded in memory, but also how it is organized for later retrieve. Interactive models of reading hold that readers make meaning from the pieces of old and new information and their relationship as information is collected from text and drawn from prior experience. Considering reading as a "psycholinguistic guessing game", Goodman (1985, cited in Schroeder, 1996) suggests that a reader constructs his or her own text during reading by applying schemata to the process through assimilation and accommodation. A number of studies such as Simonsen and Singer, 1992; Bransford and Johnson, 1973; Anderson and Pearson, 1984; cited in Schroeder,1995) supported the significance of schema-interactive model and Pearson et.al (cited in Schroeder,1995) conclude that new information is learned and remembered best when it is integrated with relevant prior knowledge, or existing schemata.

(v) Text structure

Text structure is another influence on reading that will partly account for how text is comprehended. It refers to how ideas in a text are organized to convey a message to a reader (Meyer and Rice, 1984). In other words, it provides an organizational framework that assists readers in determining the relationship between ideas and details. Given the time and practice, the readers will familiarise themselves with the typical structures of the text and how the information is presented in the text.

Anderson and Armbruster (1986) suggest two elements that influence the comprehensibility of text structure: local coherence and global coherence.

> Local coherence results from the author's correct use of "cohesive ties, "such as referents, substitutions, connectives or conjunctions. Global coherence occurs when texts are arranged logically and are connected so that they are easily understood. Examples of such organization include cause/effect, problem solution and time order sequence.

Finally, Anderson and Armbruster (1986) suggest that the more locally and globally coherent a text, the more likely is that readers will comprehend it well. However, the text structure only partly explains the task of comprehending what is read. It is the combination of metacognition and schema that plays a significant role in the processing and interpretation of new information.

(vi). The developmental factor: Age/Ability group

One of the pioneering studies on children's metacognitive knowledge in reading was carried out by Myers and Paris (1978). Myers and Paris carried out an interview study with 20 sixth graders using 18 structured questions. The questions contained information on person, task, and strategy variables. Questions about person variables involved a child's perception of characteristics of a competent reader, the relationship between specific skills such as mathematics and being a good reader, and the relationship between motivation, environmental limitations and good reading. Questions about task variables are related in a child's knowledge of the effect of the length of passages, background knowledge of the content of a story, and readers' interest in a story, reading mode, structure of paragraphs or stories and goals of reading. Questions regarding strategy variables measured the children's' awareness of using different strategies for comprehension failures either in words or in sentences.

The results revealed that the second and sixth graders knew that more time is needed to read a long story and that the background knowledge of a story helped them to comprehend the story better. However, the verbal answers to other questions differed between the two groups. For example, the older children did not think that mathematical skills were necessarily related to good reading because other factors could influence the performance of a reader. The sixth graders were aware of textural organization of sentences in paragraphs and the semantic features of the first and least sentences in a paragraph. They were also aware of the need for selecting the appropriate strategies for different reading purposes such as using skimming for quick information, using a dictionary for meaning, or asking others for help when comprehension failed, rereading if they did not understand and knew that that story telling should focus on meaning. On the other hand, the second graders were not aware of important factors that are crucial for successful reading comprehension. For example, the children did not know the strategy of skimming and therefore attended to easy words rather than informative words in skimming. In other words, these young readers were not sensitive to the needs of different tasks and the existence of effective strategies and young children's understanding of the goal of reading was based on decoding rather than meaning of construction. The study showed some important differences in metacognitive knowledge and experience held by readers in the two age group.

This study had a resemblance with a study by Canney and Winograd's (1979) where an interview technique was employed to tap the difference among second, fourth, sixth and eight graders at different reading ability levels. They obtained similar findings: good readers understood that the purpose of reading was to comprehend meaning, while poor readers perceived it as decoding. The evidence

suggests that young children are less aware than older children of aspects of reading, and that the weaknesses observed in young children have been found in poor readers. Interestingly, this might suggest that metacognitive knowledge is related to developmental factors.

2.2. Motivation, metacognition and Student performance.

2.2.1 What is "Motivation"?

In psychology, the discussion of motivation centred on the concept of observable behaviour and activity. According to Ryan and Deci (2000), to be motivated means to be moved to do something, a person who feels no impetus or inspiration to act is thus characterized as unmotivated, whereas someone who is energized or activated toward an end is considered motivated. People have different amounts and kinds of motivation, which varies not only in the *level (how much) but also in the orientation (type of motivation).* The latter concerns the underlying attitudes and goals that give rise to action- concerning the why of actions. For instance, a student could be highly motivated to learn a new set of skills if he or she understands that the learning of the skills would yield a good grade. Ryan and Deci (2000) identified two different types of *motivation, intrinsic and extrinsic. Intrinsic motivation refers to doing something because it is inherently interesting or enjoyable. When intrinsically motivated, people engage in activities that interest them, and they do so freely, with a full sense of volition and without the necessity of materials rewards or constraints. Extrinsic motivation refers to doing something because it leads to separable outcome. In other words, extrinsically motivated behaviours, are instrumental in nature that are performed not out of interest but because they are believed to be instrumental to some separable consequence. (Deci et al 1991*). Students who personally believe that the

work that they do is valuable for their future or for their grade is extrinsically motivated because they are doing the work for its instrumental value and not for their own interest.

Ryan and Deci (2000) further explained that Self-determination theory (SDT) proposes that extrinsic motivation can vary greatly in the degree to which it is autonomous and therefore divide extrinsic motivation into four types*; external regulation* which represents the least autonomous forms of extrinsic motivation, and in which the incentives is external; *introjected regulation*, is a type of internal regulation which is quite controlling because people perform such actions with the feeling of pressure to avoid guilt; *identified regulation*, is a more autonomous or self-determined form of extrinsic motivation where a person had identified with personal importance of a behaviour and has thus accepted its regulation as his or her own and *integrated regulation,* the most autonomous form of extrinsic motivation where integration occurs when identified regulations have been fully assimilated to the self, the more one internalises the reasons for an action and assimilates them to the self, the more one's extrinsically motivated actions become self-determined. However, it does not mean that as extrinsic regulation become more internalised, they are transformed into intrinsic motivation (Ryan and Deci, 2000) Internalisation and integration are the processes through which extrinsically motivated behaviours become more self-determined. Externally motivated behaviours, executed because of its instrumental value to some separable consequence would vary depending on the extent to which it represents self-determination.

Understanding different types of extrinsic motivation and what fosters each of them is the central question for educators who cannot always rely on intrinsic motivation to foster learning. For example, generative strategies as proposed by

Wittrock (1991) have an affective component as part of the learning model. These affective components, influenced by instruction provide the motivation for self-regulated learning and strategy use. Wittrock (1991) defined motivation as the process of initiating, sustaining and directing activity. Alternately, Paris and Turner (1994) coined the term-situated motivation, which is dependent on specific situations. Situated motivation is based on the framework of self-regulated learning because it involved evaluating, monitoring, and directing one's learning. In other words, motivation is situated based on personal beliefs, instructors, materials and task. This definition might imply that motivation is unstable because the learners' goal are not the same in all settings and may vary as a consequence of the learner's assessment of expectations, values, goals, and rewards in a particular setting.

Current views of student learning suggest the integration of both motivational and cognition as important components of successful academic performance (Pintrich & De Groot, 1990). Metacognition is an aspect of academic performance. It is the definition of self-regulated learning provided by Brown, Bransford, Campione, & Ferrara, (1983) that includes students' metacognitive strategies for planning, monitoring and modifying their cognition. Self regulation of cognition and behavior is also an essential aspect of academic achievement and may closely linked to the issues of motivational beliefs There are several research in educational and developmental psychology that revealed the importance of student learning that is self regulated. Pintrich and De Groot (1990) suggested the three components of self-regulated learning that are crucial for classroom performance.

> First, self-regulated learning includes students' metacognitive strategies for planning, monitoring, and modifying their cognition (e.g., Brown, Bransford, Campione, & Ferrara, 1983); Corno, 1986; Zimmerman & Pons, 1986, 1988). Students' management and control of their effort on classroom academic tasks has been proposed as another important component. For example, capable students who persist at a difficult task or block out distractor (i.e. noisy

classmates) maintain their cognitive engagement in the task, enabling them to perform better (Corno, 1986, Corno & Rohrkemper, 1985). A third important aspect of self- regulated learning that some researchers have included in their conceptualization is the actual cognitive strategies that students use to learn, remember, and understand the material (Corno & Mandinach, 1983; Zimmerman & Pons, 1986, 1988). (P.33).

Knowledge of cognitive and metacognitive strategies is usually not enough to promote student achievement; students must be motivated to use the strategies as well as regulate their cognition and effort (Paris, Lipson, & Wixon, 1983; Pintrich, 1988, 1989; Pintrich, Cross, Kozma, & McKeachie, cited in Pintrich& DeGroot, 1990). Pintrich and DeGroot (1990) used a self-report questionnaire, the Motivated Strategies for Learning Questionnaire to measure the relation between motivation and the strategies used for learning.

2.2.2 Motivational constructs

The motivation model contained three components related to this research: expectancy, Value, and affect.

(i) Expectancy component: Self- efficacy and control of learning beliefs

The expectancy component includes students' beliefs about their ability to perform a task, their judgments of self-efficacy and control, and their expectancy for success at the task (Pintrich and Schrauben, 1992). The ability to perform a task has been operationalized in terms of two types of motivational beliefs: Self-efficacy and control beliefs.

(ii) Self-efficacy

Self-efficacy is an aspect of motivation. Bandura (1986) defined self-efficacy as "people's judgments of their capabilities to organize and execute courses of action

required to attain designated types of performances" (1986,p.391). Applying this concept to reading, providing clear goals for reading tasks and feedback on progress toward success increased self-efficacy and strategies for text comprehension. In addition, students with high self-efficacy see difficult reading tasks as challenging and work diligently to master them, using their cognitive strategies productively (Pintrich and DeGroot, 1990). In an achievement context, it includes students' confidence in their cognitive skills to perform an academic task. In this research, self-efficacy would involve students' belief that they are able to learn and understand the learning materials in order to do well in the comprehension test.

(iii) Control of learning beliefs;

The measure of control beliefs would be operationalized in terms of individuals' perception of internal control for learning, particularly students' beliefs that their own efforts to learn will result in positive outcomes. Connell (1985) has suggested that there are three aspects of control beliefs: an internal source, an external source or powerful others and an unknown source. Students who believe in internal sources of control are assumed to perform better than students who believe powerful others (e.g. teachers, parents) are responsible for their success or failure or those students who don't know who or what is responsible for the outcomes (Pintrich & Schrauben, 1992).

(iv). Value component: Intrinsic value (Intrinsic goal orientation)

A value component includes students' goals and beliefs about the importance and interest of the task. The motivational theories propose some type of goal, purpose or intentionality to human behavior. The goals might range from social

cognitive proposals of relatively accessible and conscious goals to psychodynamic proposals of relatively inaccessible and unconscious goals (Zukier, 1986). There have been a number of researchers who have discussed the goal orientation such as Ames and Ames (1984), and Nicholls (1984) but one of the most crucial distinctions is between intrinsic and extrinsic goal orientation . In the research program conducted by Pintrich and Schrauben (1992), these two-goal orientations reflect students' rationale or reasons for engaging in a task. Students with an intrinsic goal orientation are assumed to be approaching the task with a focus on learning and mastery while students operating with an extrinsic goal orientation are assumed to be approaching the task with a focus on performance or grades or pleasing others. Students with an intrinsic orientation to learning and mastery of the course content might be more willing to invest cognitively in the task and use "deeper" processing strategies (Summarizing and paraphrasing) that do have some costs associated with their use (more times needed to read the course material). (Pintrich and Schrauben, 1992). On the other hand, students with an extrinsic goal orientation focused on getting good grades and not very willing to make this kind of investment in learning and use more "surface processing strategies" like rehearsal and simple recall of information (Pintrich and Schrauben, 1992).

In reading literature, goals for reading concern the purposes individuals have for engaging in activities such as reading (Ames, 1992; Blumenfeld, 1992) whereas in the motivation literature, researchers have focused primarily on two broad goal orientation individuals have for learning. Individuals with a learning goal orientation seek to improve their skills and accept new challenge in activities such as reading (Ames, 1992; Ames & Archer, 1988; Dweck & Leggett, 1988;Nicholls, 1979; Nicholls, Cheung, Lauer & Patashnick, 1989, cited in Pintrich and Schrauben, 1992).

Some researchers use the phrase mastery orientation almost synonymously with learning goal orientation. Both phrases refer to student dedication to content understanding and learning flexible skills, not to a behaviorist mastery-learning paradigm. (Guthrie & Allan Wigfield, 2000)

(v) Affective component: Anxiety

An affective component includes students' emotional reactions to the task. Test anxiety has been linked to students metacognition, cognitive strategy use and effort management (Benjamin, Mckeachie, Lin & Holinger, 1981; Culler & Holahan, 1980; Tobias, 1985, cited in Pintrich & DeGroot, 1990). For example, Benjamin et al., (1981) found that although high anxious students seemed to be as effortful and persistent as low-anxious students, they appeared to be very ineffective and inefficient learners who often did not use appropriate cognitive strategies for achievement. (Pintrich and De Groot, 1990). Other researchers however suggest that high anxious children are not persistent or avoid difficult tasks (Hill & Wigfield, 1984, cited in Pintrich and De Groot, 1990).

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(vi) Conclusion

The expectancy component and value component are of greatest interest here. Different aspects of expectancy component such as self-efficacy, attribution style, and control beliefs have been linked to metacognition and conceptualised in a variety of ways in the motivational literature. Previous research suggests that students with a motivational orientation involving goals of mastery, learning and challenge, as well as beliefs that the task is interesting and important will engage in more metacognitive activity, more cognitive strategy use, and more effective effort management (e.g., Ames & Archer, 1988; Dweck & Elliot, 1983; Eccles, 1983; Meece Blumefeld, &

Hoyle, 1988; Nolen, 1988; Paris & Oka, 1986, cited in Pintrich and De Groot, 1990). Accordingly, one purpose of this study is to examine the relationship between motivation, metacognition (self-regulated learning) and student's performance.

2.3. Use of Metacognitive strategies.

The use of metacognitive strategies implies knowledge of when and how to use the appropriate strategies (Brown, 1978) which requires the flexible use of available strategies. This will involve the reader's ability to gamble with time and effort in the use of strategies. For example, when readers encounter a new word, which is incomprehensible form the context, they might debate whether to consult a dictionary immediately. The skilled readers or high ability readers might question themselves about whether it would interfere with comprehension, and if it does, they might decide to skip the word and go on reading.

It is under the umbrella term monitoring strategies that a variety of research has been conducted with the purpose of identifying the role of metacognition in reading, differentiating the high ability or mature readers from the low ability group or young readers in their use of strategies. Monitoring strategies that appeared in the current literature include summarizing, synthesizing, evaluating, questioning, inferencing, clarifying, verbalizing and regulating etcetera. These strategies are used simultaneously and interactively. For example in order to summarize, the readers must be sensitive to the main ideas and important points as well as internalize macro rules and condense the original text to construct a succinct gist. At the same times the readers must be alert to the comprehension process by evaluating their reading as well as questioning themselves about their understanding of what is being read.

The next section will describe the strategies identified from the literature that appear

to have the cognitive, metacognitive and affective components and were used in the empirical investigation of this study to see the effects of the metacognitive instruction on reading comprehension.

2.31. Summarization

The commonly reported sophisticated method of testing one's level of comprehension and retention and, therefore, one's preparedness for a test, is the summarization of the material one has been reading. Summarizing is a complex task that requires considerable skill. Five basic rules essential to summarization were identified by Brown and Day (1983) as basic operations in comprehending and remembering prose. The rules are; (a) delete trivia; (b) delete redundancies; (c) substitute a super ordinate for a list of terms; (d) substitute a super ordinate for a list of actions; (e) select a topic sentence, if one is available; and (f) invent topic sentence, if none is available (cited in Hare & Borchardt, 1984). Brown,Day, & Jones (1983) compared summarization skills of fifth, seventh, tenth and college levels using the five rules. They used specially constructed texts that enable them to predict when each rule should be applied or at least would be applied by experts (College rhetoric teachers). The youngest children were able to use the two deletion rules with above 90% accuracy, showing that they understood the basic idea behind a summary and delete the unnecessary material. It was in the application of the complex rule that the developmental differences were apparent. Student became increasingly skilful at using the super ordination and topic sentence rules, with college students performing extremely well. The most difficult rule, invention, was almost never used by fifth graders, used on only a third of those occasions when it would be appropriate by tenth graders and used by the college students on only half of the appropriate occasions. This developmental progression was explained by Brown and Day ,1983, (cited in

Hare and Borchardt, 1984) in terms of the degree of intervention needed to apply each rule. The deletion rules only required that students to omit the information in the text and the intermediate topic-sentence rule require the identification and selection of main sentence contained in a paragraph. It is the difficult, invention rules that requires that child to write a synopsis in their own words, adding information rather than just delete, select sentences already provided for them. However, the process of invention is the essence of good summarization used by the experts that are difficult for novice learners. Borrowing from the work of Brown and day (1983), Hare and Borchardt (1984) designed a summarization intervention program, one taught inductively and one taught deductively to 22 low-income minority high school students per treatment. No significant difference in summarization process and product were observed between the two-instruction groups. However, the two groups were significantly different from a control group in terms of summarization efficiency and summarization rules. These differences were maintained 2 weeks after instruction had ended.

In another study by Brown, Day and Jones (1983) comparing the summarizing skills of students from fifth, seventh, eleventh and college levels, the developmental factors were evident in the use of strategies by students of different ages. The researchers found that the eleventh and college students prepared good drafts before writing the summaries with word limit whereas the young children did not write a good draft but ran out of space This indicates that older high school and college students exhibited the ability to utilize summarization rules to integrate the essential ideas across paragraphs and logically present them in their own words rather than copying directly from the original text. The older students were aware of the task demands. This awareness directed them to plan ahead before the task and control

their processes for condensing the idea units into a required limit. Even though these studies and other similar studies (Garner, 1985; Brown & Smiley, 1977) confirmed that the adult readers are better summary writer than younger readers, these do not mean that adult readers are better writers. It is encouraging that the rules of summarizing could be taught. The macro rules of summarizing may facilitates studying because the constructing of an adequate summary for oneself serves as check that one has both understood and remembered the material. If we make it explicit that such rules exist, that such rules can be applied regularly, and that the application of such rules does improve performance, the study skills of less able can be much improved (Baker and Brown, 1984).

2.3.2 Questioning

Hunt and Metcalf (1968) concisely stated the value of question in the promotion of students' skills to engage in reflective thinking;

> Questioning does have a necessary role in the stimulation and guidance of reflection. Questions may be used to inaugurate and push forward each step of an act of thought. Questioning is a natural technique for clarifying and creating problems (P.180)

Andre and Anderson (1978-1979) developed and tested a self-questioning study technique in where the high school students were taught to locate sections of text containing important points and generate questions about them. The researchers found that questions generation facilitated learning better than simply reading and rereading text or making up questions without regard to important points. However the training was more effective for students with lower ability, suggesting that the better students had developed effective self -questioning techniques of their own. The self-questioning incorporates many metacognitive components encouraging the reader to (a) set purposes for study, (b) identify and underline important segments of the

material, (c) generate questions which require comprehension of the text to be correctly answered, and (d) think of possible answers to the questions. The questioning strategy leads the student to an active monitoring of the learning activity and to the engagement of strategic action. (Baker and Brown, 1984).

Student-generated questions are valuable not only as an aid to studying, but also as an aid to comprehension itself. Singer's (1978) preliminary work has shown that student-generated questions are more effective in promoting comprehension than teacher generated questions, even for children in elementary school. Cohen's study (1983) demonstrates that it is possible to train elementary students to generate questions for themselves while reading short stories, and that the process of generating questions will enhance reading comprehension. A pretest of question generating was given to 60 children in the 3rd grade classes (ages ranged from 8-10 years old). Fourty eight children became subjects for the study, assigned randomly to experimental or control groups within classes. The first part of the training program was the training in question generation whilst the second part is the application of questioning skills to reading short stories. The experimental group scored 56% (20 points) correct on the criterion pretest and 87% (47 points) correct or better on the post-test. After training, 87% of these third graders (20 out of 23) demonstrated mastery by scoring 85% correct (47 points) or better on the post-test. In contrast, the control groups' scores stayed about the same-they scored 36% (20 points) correct on the criterion pre-test and 38% correct (21 points) on the post-test. On standardized comprehension test, which asked the students to answer comprehension questions after reading short stories, the experimental group scored 75% correct on the pre-test and 88% correct on the post-test. The control group 75% correct on the pre-test and 75% correct on the post-test. An examination of each group's mean number of errors

on the standard achievement test revealed large differences on pre-to post score performance. The mean number of errors for the experimental group changed from 2.09 (S.D=1.69) on the pre-test to 1.00 (S.D.=1.88) on the post-test. By comparison, the mean number of errors for the control group remained 2.04 for both the pre and post-test (S.D=1.93 and 1.92). An effect size calculated for this study was large, that is 0.72 indicating that the student generation of questions while reading prose improves comprehension.

Frase and Schwartz (1975) conducted two experiments exploring the issue of whether student-generated questions facilitated learning from prose materials and whether student-generated questions targeted the same information as the instructor-constructed questions. In Experiment 1, 48 high school students cooperated in a tutorial situation. At different times, a subject asked questions, answered question, or merely studied. In Experiment 2, 64 college students worked alone constructing 5 or 10 questions which were free to vary in difficulty or which all were to be difficult. In both studies, questioning activities produced higher overall recall than just studying. Recall effects were confined to content that was directly related to subjects' question, and recall level was the same whether questioning or answering. The students did not improve on portions of the text, which were not targeted during the study sessions. The subjects who generated questions spent approximately twice as long with the materials as the subjects who only studied, which indicates that the post-test results could have been the result of times on task.

A review of intervention studies was conducted by Rosenshine et al. (1996) in which students have been taught to generate questions as a means of improving their comprehension. The overall median effect size was 0.36 (64^{th} percentile) when standardized tests were used and 0.86 (81^{st} percentile) when experimenter-developed

tests were used. A meta-analysis conducted by Huang (1991) on Students Self-questioning strategies produced an effect size of .56, which is considered to be medium in treatment effect. To sum up, this indicates that training in effective question generation may be an important first step in the development of monitoring skills. The ability to ask relevant questions of oneself during reading is crucial to comprehension monitoring and studying. Student-self questioning is also described as metacognitive or comprehension-monitoring activity, because students trained in question generation may also acquire heightened self-awareness of their comprehension adequacy (Wong, 1985).

2.3.3 Verbalization

(i) Definition

Verbalization is an instrumental activity that mediates between the student perception of the instructional goals and the learning outcomes (Weener, 1974). Student activities that fit the definition of instrumental activities are both overt and covert. Covert forms of instrumental activities include silent and rehearsal, evoking mental images, or other verbal associates whereas the overt instrumental activities may include verbalizing (out aloud) and note taking.

Schunk (1986) referred to verbalization as private speech, which refers to the set of speech phenomena that has a self-regulatory function but is not socially communicative (Fuson, 1979). Its content can include information to be remembered, rules, strategies, beliefs about one's ability to learn, and so on. Shunk (1986) also noted that private speech is a broad concept that includes both overt (Out loud, whispering) and covert (internal) speech during engagement on motor, cognitive, and perceptual tasks (Harris, 1982).

Nist and Diehl (cited in Nist and Holschuh ,2000) had given the definition of an elaborative verbal rehearsal as a strategy that provides an important means of monitoring understanding of text. In other words, elaborative verbal strategies are metacognitive because they help students distinguish what they know from what they do not know. A good elaborative verbal rehearsal consists of the following process; (a) relating ideas across text and to prior knowledge, (b) incorporating personal reactions or opinions about the ideas, (c) summarizing key ideas in students' own words, and (d) including appropriate text examples (Simpson, 1994; cited in Nist and Holshuh, 2000). Research has indicated that the quality of the talk-through played a major role in it effectiveness, so students need explicit instruction on how to conduct an effective elaborative verbal rehearsal. Simpson (1994) explained further that this instruction should include modelling a good example, explaining the rational for strategy use, and providing feedback on students use of the strategy.

(ii) Relationship between Verbalization and self-regulation

An important link between private speech and self-regulation (Shunk, 1986) was established by cognitive developmental theory. It was in relation to this that Shunk (1986) suggests that verbalization may improve coding, storage, and retention of material, and facilitate subsequent retrieval and use. Thus, the use of verbalization might be useful in instructional procedures using instructional conversation to internalise strategies taught and information read from the text.

Golderberg (1993) described that instructional conversation as effective in helping students to internalise reading strategies. The instructional conversation creates opportunities for students not only to express ideas and discuss the strategy used but also the acquisition of new knowledge based on experience and prior

knowledge. The successful experience of reciprocal teaching developed by Palincsar and Brown (1984) might provide an example of relationship between students' verbal actions in cooperative learning environment and self-regulated learning. The emphasis was on a cooperative group discussion and dialogues with peers to enhance students' comprehension. The teaching of four major metacognitive strategies that includes summarizing, questioning, clarifying and predicting.involves a cooperative group discussion where the instructor serves as the leader and respondent in the group. The instructional procedure begins with the teacher demonstrating the use of these metacognitive strategies, providing feedback and guidance during reading, and gradually transfers the role of teaching to the student. The student takes over the role and acts as a teacher to model what the teacher has demonstrated to the students. The major objective is to prepare students to direct and control their own learning. The strategies employed are described as those used by effective readers, who refer constantly to the need to summarize the gist, to resolve ambiguities, to interpret content, to predict outcomes or future content and to gauge or test the knowledge they are acquiring (Palincsar and Brown, 1987).

During the instruction, the teachers interpret students' verbal and nonverbal actions, based on these interpretations the teachers provide the students with the additional instructional information and making adjustments in their instruction. In other words, the teachers judge students and make adjustments in their instruction based on the feedback they receive about student understandings. The teacher become a mediator who helps students construct understanding not only about the content of the text but also the strategies that aid in interpreting the text and the nature of the reading process itself.

In an instructional program that includes paraphrasing, strategy selection and use, direct instruction of appropriate reading strategies and modelling could be an effective means of assisting children in having difficulty in learning to read (Feitler and Hellekson, 1993). The modelling component of the active verbalization lesson in their research consists of four phases where, in the first two phases of the research, the teacher described the mental reasoning used in selecting reading strategies. In phase 3, a student read the passage and the teacher highlighted self-corrections made by the teacher whereas in phase 4, a student read the passage and the other students in the group identified and discussed effective strategy. These last phases of the modelling component were intended to foster independence in the selection and implementation of effective strategies. Collectively, in all phases of the modelling component, the teacher utilized a descriptive model that emphasized effective strategies used by good readers. The observational data showed that children receiving paraphrasing instruction appeared to approach reading as the linkage of associated reading strategies used to derive meaning from print rather than a series of isolated skills. The researchers reported that the experimental group performed better in comprehension test than did the control group.

However, there are studies where passive observation led to a greater reproduction than competing verbalization. For example, Zimmerman and Bell (1972) (cited in Shunk, 1986) assigned fifth graders to a verbal description, irrelevant verbalization or passive observation condition. In the research, the subjects observed an adult model nonverbally demonstrate either an associative or a conceptual rule. While the model performed, verbal description subjects verbalized the model's actions, irrelevant verbalization subjects counted aloud, and passive observation subjects silently observed. Regardless of phase of study or type of rule, passive

observation led to better performance than verbal description and irrelevant verbalization (Schunk, 1986).

The learning environment within which verbalization and self-regulated learning are taking place were supported by Vygotskian theory. This theory supports the basic assumption that educators and the interactions in which they engage with learners can have profound effects on learner's activities and their subsequent development. Vygotsky (1978) observed that a child has two development levels. The first level can be called the actual developmental level, that is, the level of development of a child's mental functions that has been established as a result of certain already completed developmental cycles. This is the level at which children can independently deal with tasks. The other level is the level of potential development where the children can solve their problem with the assistance of a teacher , adult, expert or through collaboration with other children. The zone of proximal development (ZPD) is the discrepancy between these two levels and the area within which instruction can take place.

Beside cooperative learning environment as described in reciprocal teaching, students' grade level or age group is another crucial element to be considered in the verbalization and self-regulated learning strategies. Vygotsky (1962) believed that private speech helped to develop thought through its role in organizing behaviour and hypothesized that private speech followed a curvilinear developmental pattern in that overt verbalization (e.g. thinking out aloud) increased until ages 6-7, after which it declined and became primarily covert by ages 8-10; however, overt verbalization could occur at any age when people encountered obstacles. In research exploring children's spontaneous private speech during task engagement, although the amount

of private speech decreases from about ages 4 to 8, the proportion of private speech that is self-regulating increases with age. (Fuson, 1979)

For the purpose of the empirical investigation (post meta-analysis) in this research, the first group will use verbalization techniques directed towards the self or internal (thinking out aloud) during the engagement of the tasks. The second group will also use verbalization techniques but that includes paraphrasing aloud and socially communicating the information and strategies employed during reading.

As indicated in the meta-analysis, instructional program that include paraphrasing, strategy selection and use, direct instruction of appropriate reading strategies and modelling were proven effective in improving the students performance in reading comprehension. For example, an effect size for reciprocal teaching in the current study was d=0.64. In reciprocal teaching, an important feature of reciprocal teaching is the social and verbal interaction among students and their instructor in the interactive manner. The strategies employed are described as those used by effective readers, who report that they engage in activities that closely resemble summarizing, question generating, clarifying and predicting (Hodge, 1991). One of the most significant phases is the scaffolding where the roles of instructor and student are reversed and the instructor becomes a helpful observer. As a helpful observer, the instructor supports each student's participation in the dialogue through specific feedback, praise, additional modelling and paraphrases. The peer or the students' model would have the opportunity to paraphrase and view how others use strategies to read and learn in the social learning inherent in reciprocal teaching. (More discussion on reciprocal teaching in the next section on Metacognitive Instruction and evidence base)

2.4 . Metacognitive Instructions

Up to this point, the discussion on the concept of metacognition, motivation and the metacognitive strategies such as verbalization were discussed separately to clarify he features of each and delineate each one's relationship with reading comprehension. The focus of this research is to synthesize studies on metacognitive instruction to facilitate reading comprehension. These separate components of metacognition and motivation were reunited to examine the common instructional applications for metacognitive reading instruction that enhanced reading comprehension. Before reviewing the various metacognitive programs found in the synthesis, there are various instructional dimensions appeared across interventions designed to directly or indirectly increase reading comprehension. The various component features of instructional applications were described. These includes the cognitive reading strategies within metacognitive instructions, modeling, Interaction; increased student control, and guided practice.

Cognitive reading strategies within metacognitive instructions . It was identified from the literature that metacognition did not occur as an isolated component in any of the studies. Rather, metacognitive instruction occurred concurrently with instruction in one or more cognitive reading strategies. Instruction proceeded either by teaching a cognitive reading strategy or the instructors or teachers using prereading strategies (e.g., discussion) to either organize the new knowledge or link students' prior knowledge to new information. *The cognitive strategies in the metacognitive interventions were* summarizing (Hare and Borchardt, 1984; Rinehart, S.D Stahl, and Erickson, L.G., 1986; Cordero, 2000), identify main ideas (Bauman, 1984; Slavin, 1991) , *webbing (Sinatra et al., 1984).*

Modeling . Modeling is another instructional feature that occurred in the majority of interventions (e.g., Cordero, 2000; Bauman, 1984; Hodge, 1991; Borkowski, 1992). Teachers modeled by explicitly and overtly 'thinking aloud' the steps for performing a strategy. In some studies, teachers also modeled why they performed the strategy. One issue concerning modeling is whether it alone is sufficient to benefit reading comprehension or whether modeling must be accompanied with explicit instruction. The evidence is mixed and may depend upon the reading context, tasks, and students' ability. Chan et al. (1987) and Schunk and Rice (1992) found modeling-plus-explicit instruction or specific feedback to be more effective than modeling alone for diverse learners.

Interaction . A common assumption of metacognitive instruction is that interaction induces the social construction of metacognition (e.g., Palincsar, cited in Billingsley and Wildman, 1990). For example, teacher dialogue that includes how to do a task and providing feedback to students' responses facilitates understanding of the purpose of a task and execution of a strategy (Meichenbaum, cited in Harris & Pressley, 1991). Additionally, discussions between students provide opportunities for metacognitive exchanges and modeling (Palincsar, David, & Winn, 1991). In the reviewed studies, interactions occurred between (a) teacher and students (e.g.,) and (b) target students and peers (e.g., Lysynchuk , Pressley and Vye, 1990) Lederer, 2000; Slavin, 1991; Palincsar & Brown, cited in Billingsley & Wildman, 1990; Paris et al., cited in Paris et al., 1991). Through discussions, cooperative activities, and peer conferences, students interacted to (a) determine goals for instruction; (b) implement, evaluate, and modify strategy acquisition and use; (c) discuss how a strategy could be applied in situations other than the reading lessons (e.g., Palincsar & Brown, cited in Billingsley & Wildman, 1990); and (d) make the strategies concrete and sensible (Cross & Lipson,

cited in Paris et al., 1991). Borkowski (1992) suggested that students rather than teachers play a major role in dialogue.

Increased student control . Billingsley and Wildman (1990) (cited in Collins et al., 1995) called increasing student control an important dimension of comprehension instruction. In many of the reviewed studies (e.g., Lederer, 2000; Lysynchuk, L.M., Pressley, Vye, N.J., 1990, King, C.M, 1999, Hodge, 1991) instruction occurred along a continuum of teacher versus student control. For example, instruction included three phases: (a) teacher control usually by modeling, (b) a bridge to gradually transfer control to students, and (c) independent student application. Examples of teacher control included teachers modeling how to (a) predict, question, clarify, and summarize and (b) use a five-step reading comprehension strategy (clarifying purpose of reading, activating prior knowledge, allocating attention, evaluation of contents and monitoring). Examples of gradual transfer to student control included (a) student modeling of how to predict, question, clarify, and summarize with teacher input as needed; (b) students, rather than teachers, providing encouragement, feedback, and correction and (c) students verbalizing and performing overtly five steps to a comprehension strategy under teacher guidance).

Guided practice . Chan et al. (1990) concluded that students require adequate time and practice to increase metacognition. Guided practice provides students repeated opportunities to practice procedures of a strategy under teacher supervision. During the guided practice phase of the interventions examined, teachers (a) praised, prompted, or provided additional modeling, as appropriate (b) faded prompts and increased the criterion level as students improved (c) referred to the appropriate strategy step (d) asked students to verbalize a strategy step (e) provided practice

using texts of different lengths and using expository materials rather than brief skill exercises (cited in Collins et al., 1995). Billingsley and Wildman (1990) suggested that teachers vary materials appropriate to students' reading levels and background knowledge so that students can concentrate on comprehension without thereby minimizing the effect of decoding problems.

Finally, the next section will describe how the various metacognitive instructional programs were designed to teach different strategies individually as well as in combination. The instructional methods that have been developed and used in experimental studies includes direct instruction (Bauman, 1984; Hare & Borchardt, 1991), reciprocal teaching (Palincsar & Brown, 1984, Miriam, 1998, Hodge, 1991), self–instruction (Miller, 1985), and generative learning (Wittrock, 1991; Schroeder, 1996). Among these instructional methods, direct instruction, reciprocal teaching and generative learning appear to be the most frequently investigated.

2.4.1. Direct instruction

Winograd and Hare (1988) defined direct instruction as an instructional method which emphasizes explicit and careful explanation by the teachers with the specific procedure such as structuring the learning in terms of clear academic goals broken down for maximal content coverage into manageable steps, brisk pacing and selection of sequenced, structured materials, providing details, redundant instructions and explanations with sufficient examples, asking many questions and offering numerous overt active practice opportunities, giving immediate, academically focused feedback and correction, active monitoring of student progress. Dole et al (1991) in their discussion on the research on explicit instructions have distinguished direct

instruction in the current research from those advocated in the 1970s. Even though both emphasize explicit cues by teachers about what is going to be learned, guided practice of the to be learned material and application to independent situations, the three major differences are;

> There is no assumption that the strategy will be broken down into componential sub skills, the strategy is modelled, practiced, and applied to the whole comprehension task. There is no single correct answer or single best way to apply a particular strategy. The strategy is modelled in a variety of ways and with different tasks. There is no feedback about the correctness of applying a particular strategy; rather, the adaptability and flexibility of strategies are emphasized. (Pearson and Dole, 1987)

2.4.2 Reciprocal teaching

Reciprocal teaching was developed by Palincsar and Brown (1984) to teach four major metacognitive strategies namely, summarizing, questioning, clarifying and predicting. The instructional procedure begins with the teacher demonstrating the use of these metacognitive strategies, providing feedback and guidance during reading, and gradually transfers the role of teaching to the student. The student takes over the role and acts as a teacher to model what the teacher has demonstrated to the students.

The major objective of reciprocal teaching is to prepare students to direct and control their own learning. The teaching involves a cooperative group discussion technique where the instructor serves as the leader and respondent in the group. Using a segment of the text, the instructor frames a question to which group members must respond (Hodge, 1991). The strategies employed are described as those used by effective readers, who refer constantly to the need to summarize the gist, to resolve ambiguities, to interpret content, to predict outcomes or future content and to gauge or test the knowledge they are acquiring (Palincsar and Brown, 1987).

2.4.3 Generative learning

Finally, the generative model of learning (Wittrock, M.C., 1991), unlike the other specific strategy or multiple numbers of strategies in reciprocal teaching discussed above does not provide one single approach to improve reading comprehension. The model provides a simple, flexible and theory-based strategy for improving reading comprehension (Schroeder, 1996). The teaching for reading comprehension was based on the basic concept that students must be taught how to generate meaning from text using their background knowledge and strategies for relating elements of the text to one another and to their experience. (Wittrock, 1991). Reading comprehension occurs when readers build relations among parts of the text, between student knowledge, belief, experiences and new information.

2.5 The Evidence-base

2.5.1 Evidence on direct instruction

There have been a growing number of research studies supporting the effectiveness of direct instruction. These include the studies by Paris and his colleagues (Cross & Paris, 1988; Paris, Cross & Lipson, 1984; Paris & Jacobs, 1984; Paris, Saarnio & Cross, 1986) and Baumann (1984) and Cohen (1983). The study by Bauman (1984) investigated the effectiveness of a direct instruction model for teaching children the comprehension skill of identifying the main idea on 66 sixth grade students. The experimental group received main idea instruction according to a direct instruction paradigm that required the teacher to be responsible for the academic focus, sequence of content, pupil engagement, monitoring, and corrective feedback, with a gradual shift of responsibility for learning from the teacher to the student as a lesson progressed (Bauman, 1984). The control group were engaged in

unrelated vocabulary development exercises. A series of dependent measure assessing students ability to recognize and produce explicit and implicit main ideas at the paragraph and short passage levels indicated a powerful treatment effect favouring the experimental group over the control group (Baumann, 1984) Both experimental and control group received an equivalent amount of instructional time on the given tasks, but the exact amount of time spent on the tasks were not reported. For the purpose of this meta-analysis, the effect size calculated from Bauman's study was 0.57.

2.5.2 Evidence on reciprocal teaching

A replication of reciprocal teaching with a methodology similar to that used in the pioneering work of Palincsar and Brown was conducted by Hodge (1991) and Miriam's (1998). The effect sizes were 0.62 and 0.96 respectively indicating effective outcome. A study by Miriam examined whether reciprocal teaching methods were superior to the traditional methods (skill acquisition) in large high school remedial classes. The experimental group consisting of 53 three students in five intact reading classes who received reciprocal teaching were compared to 22 students in three control group classes. The instruction was conducted on a daily basis for five consecutive school days. The daily teaching lesson lasted for 45 minutes. Each day one of the reciprocal teaching strategies (summary, questioning, prediction and clarification) was introduced accompanied with work sheets. The five experimental group classes received an additional 15 days of instruction using the method of reciprocal teaching. Each day a new passage was systematically introduced. A segment of the text was assigned to a student who read it aloud. After reading the text, the student asked questions that a teacher might ask on the segment, summarized

the content for other students, discussed and clarified any remaining difficulties, and finally made a prediction about future content. These activities were embedded within a natural context with the students in each group giving feedback to one another. Initially the adult teacher modelled the activities, but gradually the students became capable of assuming their role as the expert. Throughout the intervention, the teacher continued to provide guidance and necessary feedback to the student experts. During the intervention the students were explicitly told that these activities were general strategies designed to help them better understand how to read and that they should try to do something similar when they read silently in other subjects. Each day after approximately 35 minutes of training, the students took an unassisted assessment where they read a novel passage and answered from memory 10 comprehension questions related to it. The three control group classes continued their regular curriculum of skill acquisition remedial reading. The instruction was done on a daily basis of 20 consecutive days. The daily teaching sessions lasted for 45 minutes. No instructions on reciprocal teaching were provided for the control group to foster comprehension monitoring. However, all students from experimental group and the control group received feedback as all written work was graded and evaluated. After 20 days of intervention, the mean score of the experimental showed a significant improvement, rising to 78% as compared to the control group that remained virtually unchanged at 69.5%. The researcher however did not report the time spent by the students on the tasks.

2.5.3 Evidence on Generative learning

Finally, in the generative model of learning, Wittrock (1991) suggested that the teaching of the generative processes of learning involving students'

preconceptions, knowledge and perceptions; motivation; attention and that generation usually facilitates comprehension by an average of about 25%-50% or by a much large gain, over 100% without increasing instructional time, cost or administration. In a summary of study by Wittrock and Kelly in 1984 (cited in Wittrock, 1991) on soldiers using metacognitive strategy that involved generating three types of relations namely summaries, heading and inference-among sentences of a text, enhanced reading comprehension about 20% after two weeks of instruction for several hours per day. Indeed, the effect sizes from the study were within the range of 1.33 to 2.09. The times spent by the participants on the tasks using the given strategies were also not reported. The model provides a very simple and highly flexible strategy because a reader trained in the strategy's use has much freedom in choosing the best method for his/her learning style and task demands (Schroeder, 1996).

To conclude, previous investigations examining the effectiveness of various instructional procedures such as direct instruction, reciprocal teaching and generative learning seem to have proven the effectiveness of metacognitive strategies on reading comprehension. However, the ESs (Effect Sizes) vary in size and questions arise, therefore, as to whether these strategies are equally effective or should be regarded as having reliably different effects.

2.6 Previous Meta-analysis

In the 1980s, there was already a large pool of experimental studies on metacognition and comprehension for a meta-analysis. Haller et al. (1988) conducted a meta-analytic study covering a time span of 12 years (1975-1987) and quantitatively synthesized 20 studies on effect of metacognitive instruction on reading comprehension. Glass et al.'s (1981) meta-analytic approach was used to transform

findings to effect sizes. A general linear model using the Statistical Analysis System (SAS) was used to assess the distributions of effect sizes. To avoid having a few studies with a large number of effect sizes bias the statistical results, each study was assigned a weight of 1. If a study had only one effect size, that effect size would have a weight of 1, but if the study had 20 effect sizes, each individual effect size would have a weight of 1/20 (Haller et al., 1988). This would allow one degree of freedom for each piece of independent information.

The mean effect size was 0.71, a medium effect size with a standard deviation of .81. The analysis showed that the year of publication was significant at .05 level. The results also suggest that earlier studies had lower effect sizes than the more recent ones. The study sizes was also significant, with smaller sample sizes produced larger effects. Neither instructor nor setting, major characteristics of the natural classroom situation were significant but the location was. The results have shown that urban students benefited more from instruction than the rural students. In this study, metacognitive instruction was found to be effective for junior high students in the seventh and eighth grades. Among the metacognitive skills, awareness of textual inconsistency and the use of self-questioning as both a monitoring and a regulating strategy were most effective. (Haller et al., 1988).

Another meta-analysis was conducted by Huang (1991) covering a time span of 15 years (1973-1988). The meta-analysis was conducted on 21 studies, which resulted in a medium effect size of 0.56. The study however covered only the studies on teaching questioning strategies and its relationship with comprehension. Relationship between ES and other variables were examined and analysed. Statistical significance was detected in the relationship between ES and other variables such as sample sizes, age, and training sessions. The results of the investigation demonstrated

that the sample size of the subjects in a study has some significant effects on the treatment results. Studies with samples sizes below 30 showed a much larger ES than those with larger sample sizes indicating better treatment effects in those studies with smaller sample sizes. The study also revealed that students between the ages of 15 and 20 appear to have gained greater benefits than the other age groups in using self-questioning strategy regardless of their grade placement. Training in self-questioning also has some positive effects on students. Studies with more training sessions between five and eight yielded better treatment effects than those studies that included fewer training sessions.

In addition, another meta-analytic study was done by Fan (1993) covering a time span of 12 years (1979-1991). The study examined the relationship between teaching metacognitive reading strategies and improved reading and vocabulary comprehension. Effect size from each comparison within a study was computed and averages for each dependent measure. The meta-analysis generated a total of 223 effect sizes from 41 primary studies covering a sample size of 3,219, ranging from second graders to college students. The weighted effect size for the comprehension was .56, a medium effect size, and the weighted average effect size for vocabulary comprehension was .23, a small effect size. Before pursuing further analysis, confidence intervals of the effect sizes were tested to examine whether the literature search is comprehensive, or whether the literature represents a selected population. The confidence interval test for the dependent variable of reading comprehension showed that the confidence intervals of 11 effect sizes did not cover the weighted average effect sizes of .56. These cases however took only 5% of all the effect sizes for that dependent variable indicating that the sample was representative. Tests for Homogeneity of Variances were conducted using the statistic Q for computing the

heterogeneity of variance. The overall Q value for the dependent variable, reading comprehension was 580.163, indicating the homogeneity of variance assumption was violated. To detect the potential causes for the excess variation uncovered in the effect sizes estimates, Fan (1996) examined and analysed the relationship between ES and study characteristics using Analysis of variance. None of the analyses was found to be significant at $p<.05$, Fan (1993) concluded that this indicates that the factor's included in each variable had an equal and positive effect on the final outcome.

The three meta-analytic studies produced positive outcomes on the effect of teaching metacognitive reading strategies with a medium effect size of 0.71, 0.56 and 0.56 respectively. Several studies were omitted from their databases. Haller et al., (1988) covered the studies from 1975 until the year 1987, Huang (1991) covered up from 1973 to 1988 and analysed the studies on teaching questioning strategies only whereas Fan (1993) meta-analysed the studies from 1979 until the year 1991. The present meta-analysis conducted the studies published from the year 1980 until year 2000.

Except for Fan (1993), both studies by Haller (1988) and Huang (1991) did not conduct the confidence intervals tests of the effect sizes to examine whether they appeared to arise from a homogeneous population. To further examine the relationship between ES and other variables, the three meta-analytic studies use the conventional statistical procedures, i.e. the analysis of variance. According to Hedges and Olkin (1985), there are two concerns with this procedure,

> First, the assumptions for the analysis of variance may not be met by the effect size data because effect size estimates probably will not have the same distribution within cells. The variance of an individual observation (effect size estimate) is inversely proportional to the number of subjects in the study. When studies have different sample sizes, the individual "error" variance can differ by a factor of 10 or 20. Secondly, even if the between-class test is accurate, the use of ANOVA does not provide any indication whether or not studies within the classes share a common effect size. Thus, even if an

> ANOVA correctly detects that two classes of studies have a different average effect size, there is no guarantee that the average effect size within each class is a reflection of a common underlying effect size for that class.(P.148)

Only the analyses by Fan (1993) produced none significant results on any of the variables in the study. However, statistical insignificance does not necessarily means that a difference has no practical significance. By the same token, statistical significance does not necessarily mean that a difference has practical value. Hedges and Olkin (1985) concluded the discussion on the statistical Problems with Conventional Analyses;

> The Violation of the Homogeneity of variance assumption in the analysis of variance and in regression analysis is severe in research synthesis. Moreover, the type of violation of the assumptions has not been extensively studied. There is little reason to believe that the usual robustness of the F-test will somehow prevail. The statistical problem of violation of the assumptions of conventional statistical procedures, and the potential problem of bias due to pooling of systematic variation into estimates of error variance, raises severe questions about the validity of conventional statistical procedures in meta-analysis. There does not appear to be any rigorously defensible argument for the use of conventional t-tests, analysis of variance, or regression analysis to analyses effect sizes or correlations. (Hedges and Olkin, 1985, P. 12)

With the growing numbers of research efforts in metacognitive strategies, it is crucial that a meta-analysis on comprehensive metacognitive reading strategies be carried out to provide the researchers and the educators with the latest information on the overall effect of different instructional features in metacognitive reading strategy instructions.

2.7 Conclusion

This chapter provides a theoretical review on 'metacognition' and the concepts related to the empirical investigation as identified by the meta-analysis. Previous evidence on the application of metacognitive strategies on reading comprehension through various instructional procedures such as direct instruction, reciprocal teaching and generative learning were also discussed to provide a better understanding on the

model used for this research. It was also from these instructional models that the appropriate metacognitive learning environment were identified, e.g. cooperative learning structures. The instructional strategies and the metacognitive learning environment were concurrent with the new model of socially constructed knowledge giving emphasis to what actually happens in classrooms among teachers and students.

Finally, before meta-analysis was conducted, previous meta-analytic studies on metacognition and reading comprehension were searched for the purpose of comparing the outcomes from the previous studies with the findings from the current meta-analysis. The available evidences from the theoretical review and quantitative synthesis provides a better understanding on the new approach that has been proposed and researched in recognition of the need for better reading comprehension. The discussions on the effectiveness of treatment were followed by the evidences from the meta-analysis where an effect size was used as the index to represent an estimate of the value of a treatment. The next chapter (Chapter 3) on the integrative research synthesis using meta-analysis will provide us with the overall estimate of effect size on the effectiveness of metacognitive strategies on reading comprehension. The outcomes from the meta-analysis will provide the researcher with more variables needed to be considered for the empirical investigation as discussed in chapter 4.

CHAPTER THREE

Meta-analysis: A quantitative synthesis on the effects of metacognitive strategies on reading comprehension.

3.0 Introduction

The overall domain of interest in this chapter is to review the effectiveness of the metacognitive strategies that are likely to facilitate reading comprehension. A quantitative synthesis using meta-analysis was conducted to review the primary research studies related to the purpose of the study with effect size as the measure of the effectiveness of teaching metacognitive reading strategies.

This chapter will describe briefly the procedures employed for conducting the integrative research review and the results of the meta-analysis. The first section presents the formulation of research questions. The second section describes the method or steps during the meta-analysis such as sources of data, criteria for study inclusion, the variables coded from each study and the computation and analyses of effect sizes. The Final section will present the results of exploratory data analyses and homogeneity analysis using Analog to the Analysis of variance.

3.1 Research Questions

To examine the overall effectiveness of metacognitive reading strategies in reading and discover patterns inherent in combined studies that individual studies may not be able to do, the problem can be stated in the following research questions:

1. What is the overall effect of metacognitive reading strategy instructions on comprehension?

   i) What is the effect of metacognitive reading strategy instruction on *reading comprehension?*

   ii) What is the effect of metacognitive reading strategy instruction on *vocabulary comprehension*?

   iii) What is the effect of metacognitive reading strategy instruction on *written assignment?*

2. Does the reported effect size appear to be biased because most of the research is taken from the journals?
3. Does the effect differ due to the variables associated with the study characteristics such as;

   a. **Publication characteristics**; year and publication type?

   b. **Subject characteristics**; grade level and ability level?

   c. **Instructional Characteristics;** type of materials used for reading, and post-tests measures, instructors during the treatment and the strategies used?

   d. **Design characteristics;** such as methods of assignment, the length of treatment in days, the number of training sessions, sample size?

3.2 Method

A meta-analysis involves, (1) comprehensive literature search (2) establishing criteria for study selection (3) coding the characteristics of the selected studies. (4) Computation of effect sizes; (5) Sensitivity analysis and diagnostics; exploratory data analysis (6) Identifying Independent Hypothesis Tests and creating an independent set

of effect sizes (7) Determine the confidence Interval for the mean (8) Test for homogeneity of the distribution (9) the search for publication bias (10) Analysis of heterogeneous distributions of effect size

3.2.1 Literature search

Three major techniques were employed to locate relevant studies: computer searches, manual searches and examination of bibliographies in articles and books. The first step in this meta-analysis was to collect a large number of studies that examines the effects of cognitive and metacognitive strategies on students' reading comprehension. The collecting process began by computer searching through on line databases such as ERIC, a database on educational materials from the Educational Resources Information Centre, PsycINFO, Education abstracts, Social science citation indexes, Indexes to UK theses, and UMI ProQuest dissertation abstracts. The databases were systematically scanned for studies from 1980s to year 2000. ERIC, PsycINFO, and Education abstracts and Social science indexes produced records of 473 abstracts and articles. After computer searchers had been completed, back issues of specific journals from *1980s to year 2000* such as *Reading Research quarterly, Reading Research and Instruction, Journal of Educational psychology, Journal of Research in Reading, Journal of Educational Research, Educational psychologist, and Reading Teacher journal* were hand searched.

3.2.2 Variables coded from each study

General information coded for each study included;

(1) Publication year,

(2) Publication type (Journal, dissertation, Education abstract, dissertation abstract, and thesis),

(3) Methods of assignment to groups

Characteristics of research design such as randomisation giving an equivalent control group versus non-randomisation giving a non-equivalent control group or "comparison" control group were coded from the study. Studies that used random assignment or matching in the pre-experimental conditions were grouped into stringent methods of assignment. Other studies that did not randomly assign the samples giving a non-equivalent control group were categorized under 'less stringent' methods of assignment.

(4) Sample size,

(5) Characteristics of the participants in each study were coded according to Grade levels, and ability groups

(6) Instructional strategies such as direct instruction, reciprocal teaching and generative learning in the teaching of comprehension, self-instruction, and verbalization and questioning.

(7) Instructors

(10)Duration of the treatment

(11) Characteristics of reading materials

(12) Types of Post-tests materials; standardized or experimenter developed tests

(13) Types of instructors

(14)Duration of treatment

(15)Location of the school

(16)Outcome measures

3.2.3 Criteria for inclusion and exclusion of studies in the review

Establishing the criteria for selecting relevant studies to be included in the meta-analysis is one of the most important steps in the entire procedure. Since the focus of this meta-analysis was on the effects of metacognitive strategies on reading comprehension, the keywords used for the search of the literature were 'metacognitive' and 'reading comprehension'. Obviously, the criteria had to come

from the definition of strategies that are metacognitive in nature. The identified strategies were: questioning, summarizing, paraphrasing, clarifying, predicting, identifying main ideas, text-reorganization, inferencing, hypothesizing, look back strategies, and regulating.

Firstly, the pool of relevant literature was narrowed down to include primary studies investigating the effectiveness of metacognitive strategies to improve reading comprehension. To be specific, studies included in the meta-analysis had to include an intervention particularly on the learners. This resulted in the exclusion of survey studies, case studies and comparative studies that did not present the effect of an intervention. Even the studies that focused on training the teachers on how to teach the metacognitive strategies were excluded. Suffice it to say, this meta-analysis would only include the training studies or intervention on the learners using the metacognitive strategies to improve their reading comprehension.

Secondly, the studies had to be quantitative in nature and include at least one treatment group, with either a control group or a comparison group. Studies without comparison or control group or studies with one group repeated measures were dropped out. The subjects might be randomly assigned to the treatment and control group or might be matched on reading and learning ability, or whether they were from intact classes. Studies that randomly assigned the subjects and matched on reading and learning ability were categorised as 'stringent' whereas the quasi experimental studies where assignment of students to conditions was not random or from intact classes were labelled as 'non stringent'.

Third, the outcomes of treatment included reading measures either on *standardized tests or experimenter-developed comprehension tests.*

Fourth, the study should provide sufficient quantitative information to permit the calculation of effect sizes. These will be calculated from *the means and standard deviations* of the performances outcomes for the experimental and control conditions, or from tests of the significance of the differences in performance between instructional conditions (e.g., *t tests, F statistics and proportions).*

Fifth, this meta-analysis used the correction factor to remove bias in the effect size estimates of studies with small sample sizes. Therefore, studies that failed to include the information on sample or group sizes will have to be excluded from the meta-analysis.

Finally, this meta-analysis will only include studies published in the 1980s and early 2000. Popular studies in Reciprocal teaching such as *Palincsar and Brown (1984)* that frequently appeared in previous meta-analysis such as Fan (1993) and Hattie et al. (1996) were not included in the meta-analysis. However, studies that have adapted Palincsar's and Brown's strategies such as Lederer (2000), Alfassi (1998) and Hodge (1991) were selected for the meta-analysis.

Due to the criteria and the nature of meta-analysis, the results of this quantitative synthesis only represent studies that met the criteria for the inclusion. Most studies excluded from the meta-analysis were the qualitative reports or the quantitative reports that did not provide sufficient information for the computation of effect sizes.

3.2.4 Computation of effect sizes

An effect size was used as the index to represent an estimate of the value of a treatment by obtaining the difference between the means of the intervention group and the control group divided by the pooled within group standard deviation. The effect sizes were calculated from statistical information from reported statistics such as

means and standard deviations, t tests and F statistics. Few studies reported the findings of their studies with effect sizes and calculation were made from these studies.

Conversion from means and standard deviations involves the following formula;

$$ES = \frac{\text{(Mean of Experimental /treatment group)-(Mean of Control/comparison group)}}{\text{Pooled standard deviation}}$$

The pooled standard deviation is calculated as follows:

$$S = \frac{\sqrt{(n^E - 1)(S^E)^2 + (n^C - 1)(S^C)^2}}{n^E + n^C - 2}$$

(Hedges and Olkin, 1985; P.79)

From t;

$$d = \frac{2t}{\sqrt{df}}$$

(Wolf, 1986; P.35)

From F- ratio (F), one-way ANOVA and total sample size (N). Assumes $n_1 = n_2$

$$ES = 2\sqrt{\frac{F}{N}}$$

(Lipsey, M.W, and D.B.Wilson,, 2001; P.199)

3.2.5 Sensitivity Analysis and diagnostics

Exploratory data analysis is considered to be a part of sensitivity analysis to help reveal features of the data that could have a large impact on the choice of more formal statistical procedures and the interpretation of the results (Greenhouse, J.B., and Iyengar, S., 1994).

In this investigation, sensitivity analysis was carried out to avoid the erroneous conclusions based on a few influential observations and to check how sensitive the conclusions are to changes in data. Sensitivity analysis is a systematic approach to the question, "What happens if some aspect of the data or the analysis is changed?" (Greenhouse and Iyengar, 1994).

(i) Exploratory Data Analysis

Here, a graphical technique such as the stem–and- leaf plot was used to identify the unusual or outlying studies whereas, a forest plot of effect sizes and their individual 95% confidence intervals was plotted to show the general summary of the data. The confidence intervals of the effect sizes from each of the studies were illustrated along with the name of the authors. Among the 82 effect sizes for reading comprehension, 87.81 % were positive and 12.9% of the studies were negative. The positive effect implies that students receiving metacognitive reading strategy instruction outperformed students in the control group, while the negative effect sizes means that students in the control group performed better than students receiving metacognitive reading strategy instructions.

The 95% confidence intervals were plotted using:

ES + 1.96 * e and ES – 1.96 *e

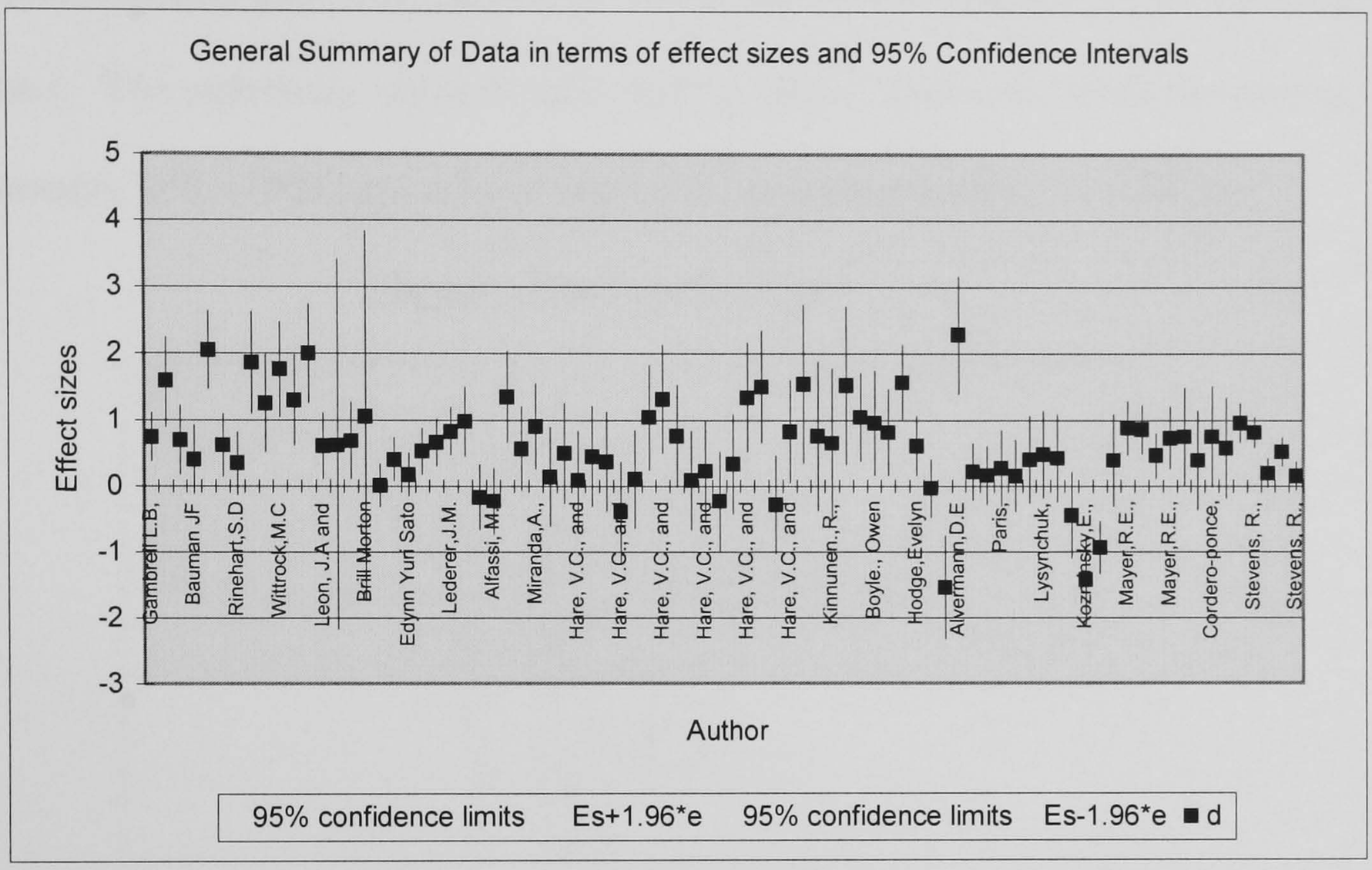
**Notes: 'e' is the standard error for ES using the formula;

$$\text{SE for ES} = \sqrt{\frac{d^2}{2(n_E + n_c)} + \bar{n}}$$

$$= \sqrt{v} = e$$

(Hedges and Olkin,1985,P.89)

Figure 1



For the purpose of data exploration, 27 studies with a total number of 82 effect sizes were analysed. The effect sizes (ES) from individual studies were weighted by the reciprocal of their sampling variance and the general formula for the weighted mean effect size is $\bar{d} = \sum wd / \sum w$ (Hedges and Olkin, 1985). The unweighted estimate of ES turned out to be 0.60, whereas the unbiased estimate of ES was 0.50. In this meta-analysis, when the effect sizes were computed, a correction factor was used to adjust the effect sizes particularly for studies with small sample sizes using the formula provided by Hedges, Shymansky and Woodworth (1989), *J=1-3/ (4m-1)*

[m is the degrees of freedom of S (pooled standard deviation), that is,*

$m=n_c+n_e-2]$

The unbiased effect size estimate is the product of J and g (* g is the (biased) effect size estimate), therefore d= J*g

(Hedges, L.V., Shymansky, J.A., and Woodworth, G., 1989; P.26)

(ii) Identifying Outliers

Stem-and-leaf plot was plotted to detect the outside values or the outlying effect sizes. The extremely negative and positive effect sizes were from the studies by Alvermann, D.E, (1988) and of Kozminsky, E., and Kozminsky, L., (2001).

Figure 2 Stem and Leaf plot

```
-1   54
-0   9
     ***OUTSIDE VALUES***
-0   4
-0   3222
-0   10
 0   000111111
 0H  222233333
 0   444444455555
 0M  66666666777777
 0H  8888889999
 1   000
 1   22333
 1   45555
 1   7
 1   89
 2   0
     ***OUTSIDE VALUES***
 2   2
```

STEM AND LEAF PLOT OF VARIABLE: ES , N = 82
MINIMUM IS: -2.
LOWER HINGE IS: 0.
MEDIAN IS: 1.
UPPER HINGE IS: 1.
MAXIMUM IS: 2.

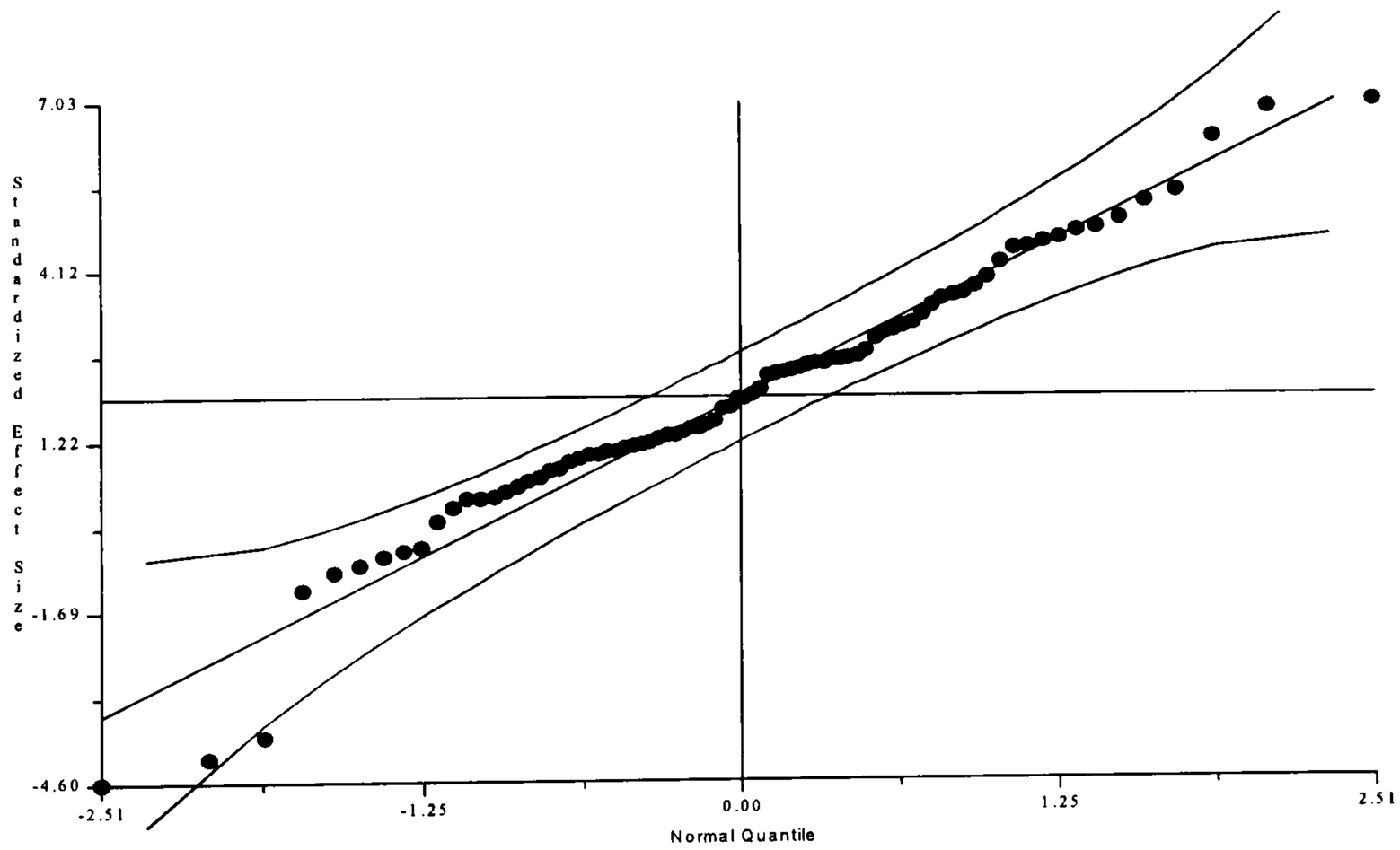
The highest and lowest effect sizes came from a study by Alvermaan, D.E. (1988) followed by the extreme negative values from Kozminsky E., and Kozminsky, L., (2001). When these unusual studies were set aside, the differences still exist among the remaining studies. The variation might be partly due to the sampling fluctuations shown in the sampling standard errors or perhaps associated with different study characteristics. The next step in this exploration is to conduct

homogeneity analysis using *MetaWin (Version 2.0)*, a statistical software for Meta-Analysis by Rosenberg, et al. (2000). A further breakdown analysis and the plotting of confidence Interval's graph was also performed using Microsoft excel spreadsheet where the coded data and computation of effect sizes have been done earlier.

(iii) Homogeneity analysis

It is important to ask whether the various effect sizes that are averaged into a mean value all estimate the same population effect size (Lipsey, M.W., and Wilson, D.B., 2001). A normal quantile plot was plotted and examined, not all the data fall on the straight line. It shows that one of the dots was outside the confidence intervals band, which indicated that the population did not come from a single normal population. (Wang and Bushman, 1998)

Figure 3 Normal Quantile Plot



The individual studies were combined and effect size estimates were computed to test whether the assumption of homogeneity of variance is met or whether they appear heterogeneous. The test of homogeneity of ES was calculated based on Rosenthal and Rubin's method (Wolf, 1986) where $\chi^2 = \sum(w(d-\bar{d})^2)$ where $\bar{d}$ is the weighted mean of the studies to be aggregated, d is the ES for each study, and w is the reciprocal of estimated variance of each d. The result is a χ^2 distribution with K-1 df where K is the number of studies. With df = K-1=82-1 =81, the observed value of the Homogeneity statistics is *Q=377.4657 (Mean Effect Size= 0.5038 95% CI = 0.4483 to 0.5592),* when compared with a chi-square for df = k-1 (Hedges and Olkin, 1985; Fitz-Gibbon et al., 1987), the value exceeds 99th percentile of the chi-square distribution with 81 degrees of freedom indicating that the studies were significantly heterogeneous.

(iv) Heterogeneity plot

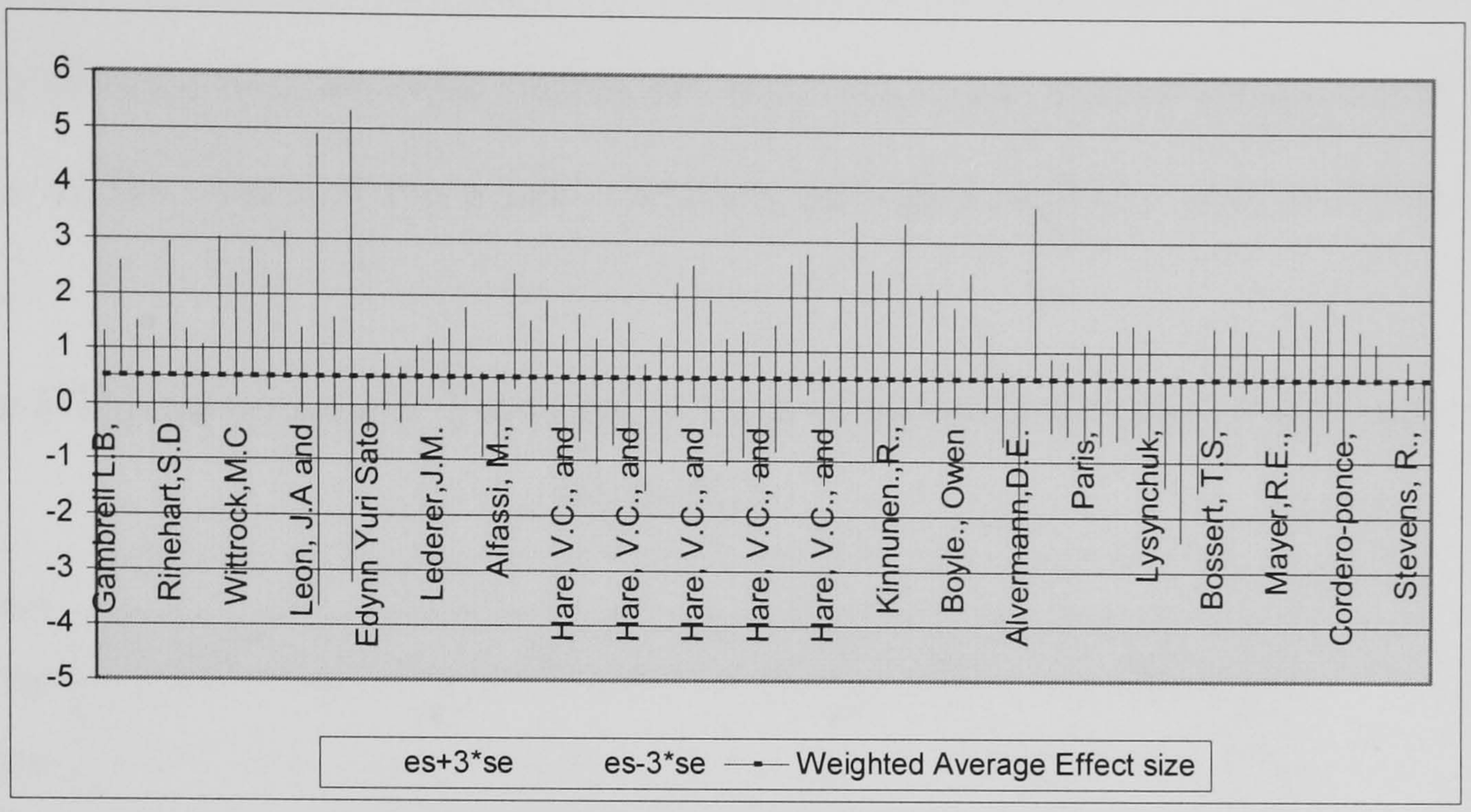
Following the suggestions from Hedges, Shymansky and Woodworth (1989), the effect sizes were plotted with three sampling standard errors using Microsoft excel spreadsheet. About 18 effect sizes did not cover the weighted average of 0.50. The error bars of the deviant effects failed to cover the weighted average effect size.

The heterogeneity (Q) statistics was recalculated without the 18 effect sizes and the results were;

Heterogeneity	*df*	*Prob(Chi-Square)*
Qtotal 95.0705	*63*	*0.00560*

Mean Effect Size	*95% CI*
++ 0.5558	*0.4867 to 0.6250*

Figure 4 Heterogeneity Plot



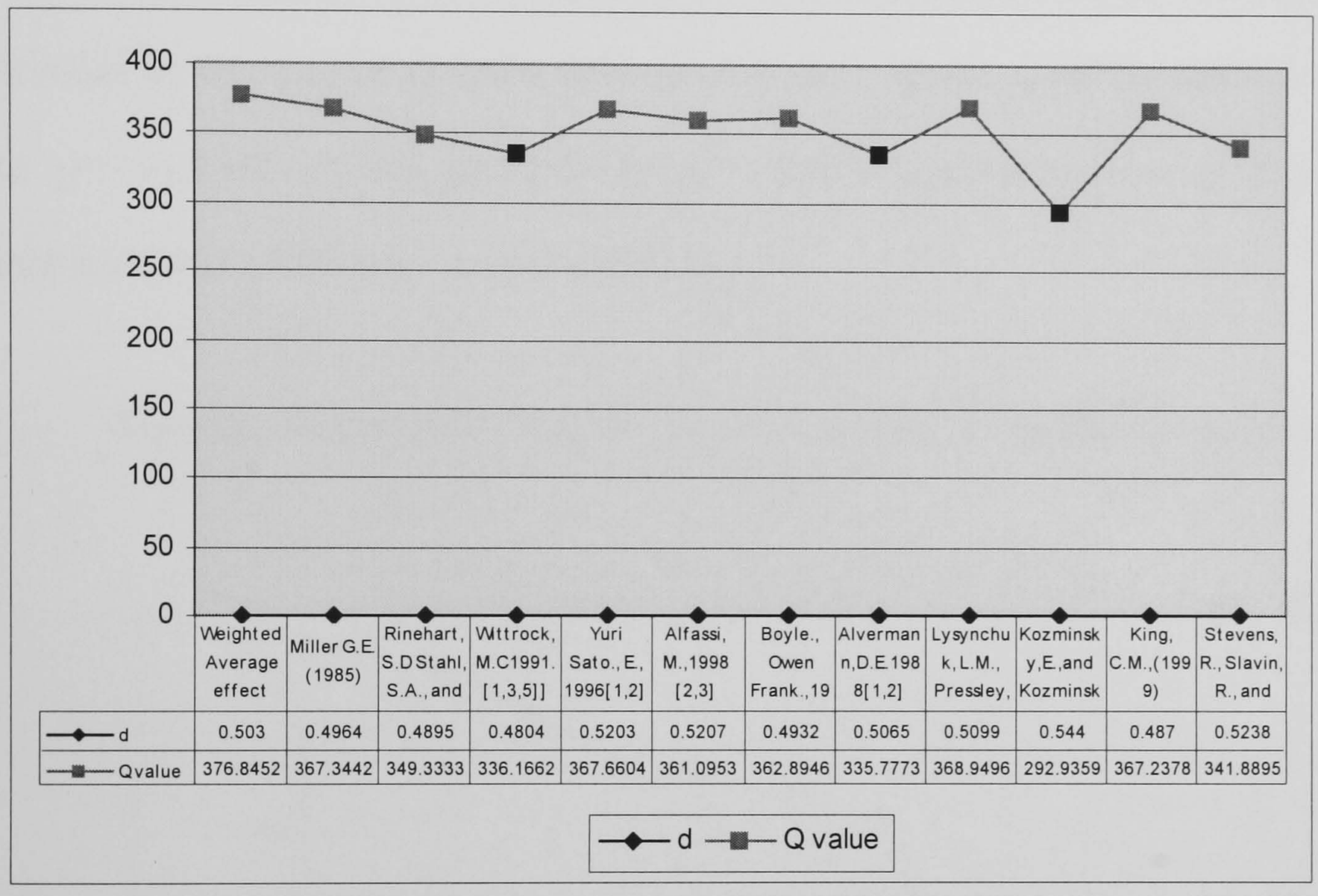
The statistical significant Q at this point indicates heterogeneity and warrants additional analysis. The variability might be greater than the subject- level sampling error and there might be essential random differences between studies related to procedures, settings and the like. The effect sizes with the deviant effects from each of the studies identified were further examined before any decisions were made whether to include or exclude from further analysis.

(v) Examining the Characteristics of Studies with Extreme and Deviant effect sizes

The confidence intervals tests identified about *eighteen* effect sizes were deviated from the weighted average effect size of d=0.503. Each of the effect sizes was included and excluded from the studies to see the changes in the average weighted effect size and the Q value (see figure 5 below). Obviously, effect sizes from relevant studies by *Alvermann, D.E. (1988)[1], Alvermann, D.E. (1988)[2],*

Kozminsky E., and Kozminsky, L., (2001)[1], Kozminsky E., Kozminsky, L., (2001)[2], Wittrock,M.C., 1991[1] , Wittrock,M.C., 1991[3] and Wittrock,M.C., 1991[5] were strikingly deviated from the other studies and were removed to avoid disproportionate influence on the values of the means, variances and other statistics used in further analysis.

Figure 5 The Inclusion and Exclusion of Each of the deviated effect sizes from the studies.



	Weighted Average effect	Miller G.E. (1985)	Rinehart, S.D Stahl, S.A., and	Wittrock, M.C1991. [1,3,5]]	Yuri Sato., E., 1996[1,2]	Alfassi, M.,1998 [2,3]	Boyle., Owen Frank.,19	Alverman n,D.E.198 8[1,2]	Lysynchu k,L.M., Pressley,	Kozminsk y,E.,and Kozminsk	King, C.M.,(199 9)	Stevens, R., Slavin, R., and
d	0.503	0.4964	0.4895	0.4804	0.5203	0.5207	0.4932	0.5065	0.5099	0.544	0.487	0.5238
Qvalue	376.8452	367.3442	349.3333	336.1662	367.6604	361.0953	362.8946	335.7773	368.9496	292.9359	367.2378	341.8895

Close examination of the effect sizes from studies by Rinehart,S.D Stahl, S.A., and Erickson,L.G., 1986 [1] and Yuri Sato, E., 1996 [1] Yuri Sato, E., 1996 [2] resulted in the exclusion of these deviated effect sizes. Obviously, the recorded effect size from Rinehart,S.D Stahl, S.A., and Erickson,L.G., 1986 [1] was the outcome for the 'quality of notes' whereas the calculated effect size from Yuri Sato., E., 1996 [1,] and Yuri Sato, E., 1996 [2] were the students' metacognitive awareness'. With the removal of ten effect sizes, the result was;

Heterogeneity df Prob(Chi-Square)

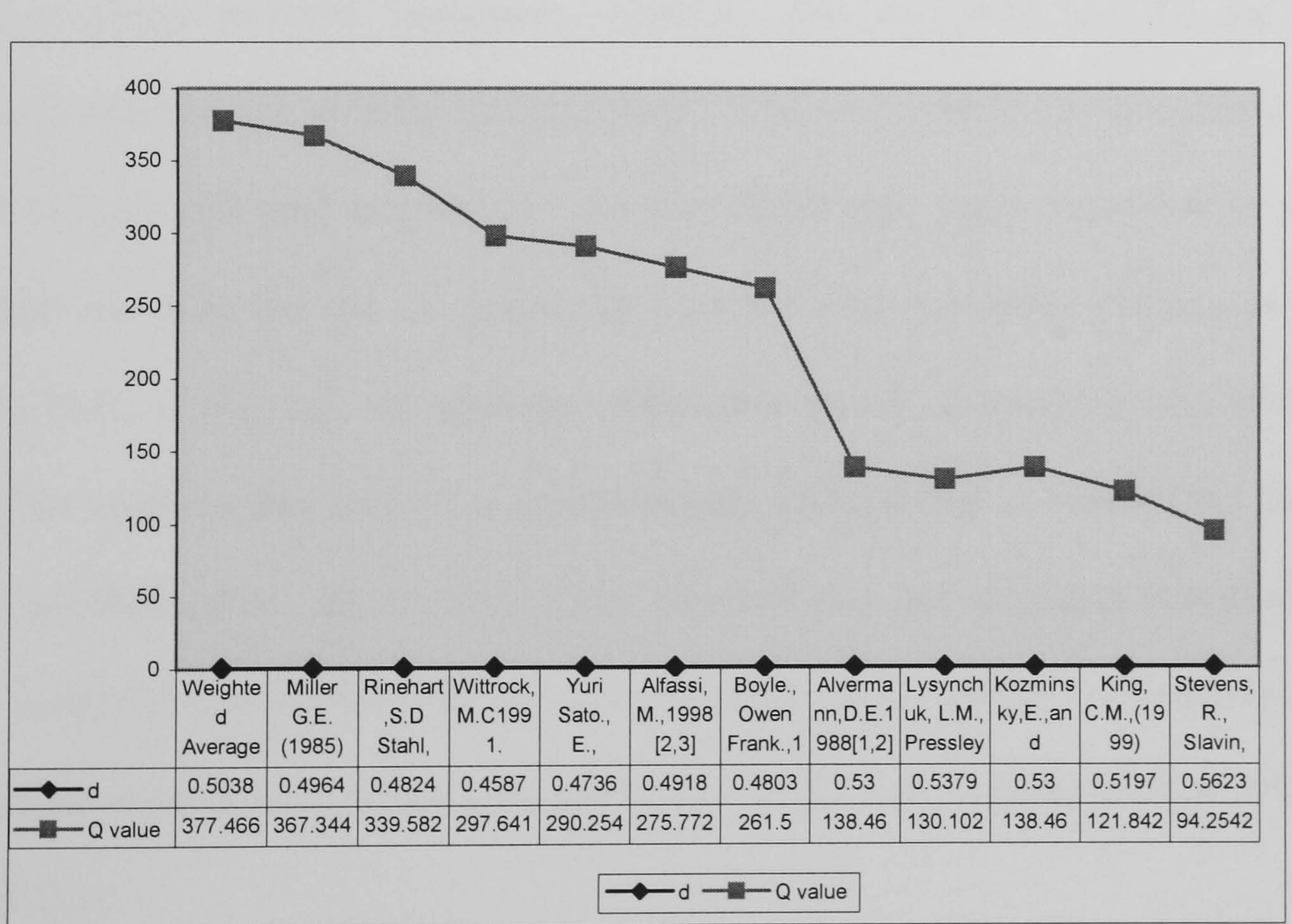
Qtotal 177.1194 71 0.00000

Mean Effect Size 95% CI

E++ 0.5289 0.4699 to 0.5879

The effect sizes from each of the studies were added up and excluded gradually from the analysis. The gradual exclusion of the effect sizes from the studies resulted in the drop of Q value from *Q=377.4657, df=81, prob(chi square)= 0.000* to *Q= 94.2542 , df= 62, prob(chi square)= 0.00516 and an increase of Mean Effect size to 0.5623 (95% CI = 0.4917 to 0.6330).*

Figure 6. The gradual exclusion of deviated effect sizes from the studies



	Weighted Average	Miller G.E. (1985)	Rinehart ,S.D Stahl,	Wittrock, M.C1991.	Yuri Sato., E.,	Alfassi, M.,1998 [2,3]	Boyle., Owen Frank.,1	Alvermann,D.E.1988[1,2]	Lysynchuk, L.M., Pressley	Kozminsky,E.,and	King, C.M.,(1999)	Stevens, R., Slavin,
d	0.5038	0.4964	0.4824	0.4587	0.4736	0.4918	0.4803	0.53	0.5379	0.53	0.5197	0.5623
Q value	377.466	367.344	339.582	297.641	290.254	275.772	261.5	138.46	130.102	138.46	121.842	94.2542

The relevant studies were also examined to determine why they were deviated. As for the study by Alvermann, D.E., (1988), this was the only study in this meta-analysis where metacognitive training study involved the high school students taking

into account the students' perceived reading abilities instead of just classifying the students solely on the basis of their standardized reading scores. The effect was lowest (ES= -1.54) when the students trained with *graphic organizer* was conducted with the *self-perceived high ability comprehenders.* On the other hand, the effect was highest (ES= 2.27) when the self=perceived low ability comprehenders were exposed to the graphic organizer treatment. As to the other two extremely negative effect sizes, the studies are conducted by Kozminsky E., and Kozminsky, L., (2001) with the ninth graders in two comprehensive high schools in a city in southern Israel. This is the only study in the meta-analysis with the *Israeli population conducted in Hebrew* (students' native language).

The large effect sizes from Wittrock, M.C., 1991[1], Wittrock, M.C., 1991 [3] Wittrock, M.C., 1991 [5] might be due to the multiple strategies used such as the *drawing of simple pictures*, s*ummaries, headings and inferences* and the use of examples in combination with the metacognitive strategies taught to generate relations between the text and their experience. Another factor that might contribute to the large effect size was the use of marginally literate soldiers or older students as in Wittrock, M.C, (1991) [1]. In addition, Wittrock's model of teaching emphasizes teaching the students that success in school begins with a *belief* in themselves, their *abilities* and their *effort.* By exerting effort, their abilities and strategies will enable them to control outcomes; they can succeed (Wittrock, M.C., 1991). *(Please see a list of studies with deviant effect sizes and notes on its study characteristics in the Appendix B.3).*

The remaining effect sizes from Boyle, O.F., (1986), might deviate from other studies due to the use of cognitive mapping to facilitate the writing of an essay, whereas Stevens., R., et al. (1991) demonstrated the use of Main idea questions and

inference questions to measure the transfer of learning strategies such as CL (direct instruction with cooperative learning processes) and DI (direct instruction). The use of cooperative learning in addition to direct instruction seems to be more effective on main-idea comprehension (+0.82) than inferential comprehension (+0.20). Even the uses of direct instruction alone were found to be more effective with main idea comprehension (+0.52) compared to inferential comprehension (+0.15). Thus, the obvious difference of results might stems from the impact of different strategy use.

Also, the difference of result might come from different measures of outcomes on different ability group. For example, a study by King, C.M., (1999) resulted from the use of reciprocal teaching with students from different ability groups such as *learning disabled, special needs and regular education students,* and the negative effect size extracted from Lysynchuk, L.M., et al. (1990) was the outcome from the vocabulary test.

Before any further analyses were carried out, ten effect sizes were removed. These included,obviously, effect sizes from relevant studies by *Alvermann, D.E. (1988)[1], Alvermann, D.E. (1988)[2], Kozminsky E., and Kozminsky, L., (2001)[1], Kozminsky E., Kozminsky, L., (2001)[2], Wittrock,M.C., 1991[1] , Wittrock,M.C., 1991[3] and Wittrock,M.C., 1991[5]*, Rinehart,S.D Stahl, S.A., and Erickson,L.G., 1986 [1] and Yuri Sato, E., 1996 [1] Yuri Sato, E., 1996 [2].

(vi) Homogeneity test with dependent effect sizes

With the removal of ten effect sizes, the mean effect size was 0.53, *(Q=177.12, df=71, prob = 0.00, 95% CI= 0.47 to 0.59).* The statistically significant Qt (see table 1) indicates that one or more factors other than chance or sampling error account for the heterogeneous distribution of effect sizes for the effects of

metacognitive strategies on comprehension. As a result, cases associated with large Q values were further examined using the study features or study characteristics to explore the causes for the excess variance in the dependent variable, reading comprehension. The statistically significant values of Qw (within-group chi-square statistic) associated with reading comprehension indicate that further grouping was necessary. The homogeneity of variance for vocabulary comprehension and essays were not violated, no further analysis was pursued for this variable.

Summary of results from meta-analysis, derived from dependent effect sizes were shown in table 1.

Table 1
Summary of results from meta-analysis (dependent effect sizes)

	No. of studies	Mean effect size	95% Confidence Interval for *d*			
	K	*d*	*Lower*	*Upper*	*QT*	
Total comparison with the control group	72	0.53	0.47	0.59	177.12*	
Variable and Class					*Qw*	*QB*
Type of outcome measure						40.15*
Reading comprehension	61	0.52	0.46	0.38	129.83*	
Vocabulary	4	-0.06	-0.49	1.44	0.21	
Writing	5	1.18	0.77	1.59	2.87	
Others	2	0.77	-1.26	2.80	0.21	
Publication year						2.40
1980s	35	0.54	0.43	0.65	71.79*	
1990s	30	0.50	0.42	0.58	101.36*	
2000	7	0.65	0.43	0.88	1.56	
Publication type						11.21*
Journal	57	0.50	0.44	0.57	132.58*	
ERIC	7	0.97	0.64	1.30	5.13	
Dissertations	8	0.54	0.31	0.76	28.20*	
Grade Level						9.8
2-3	10	0.60	0.39	0.81	24.66*	
4-6	22	0.48	0.40	0.57	55.67*	
7-9	1	1.05	-1.74	3.84	0.00	
10-12	18	0.42	0.23	0.62	33.91*	
College	17	0.60	0.47	0.74	49.44*	
Others	4	0.94	0.37	1.51	3.4	

Type of students						21.64*
Mixed ability	19	0.75	0.62	0.87	21.50	
Low ability	24	0.50	0.41	0.58	77.20*	
Average	10	0.32	0.14	0.51	22.87*	
High ability	18	0.42	0.23	0.62	33.91*	
Types of Reading						17.57*
Narrative	11	0.26	0.08	0.44	9.39	
Expository	54	0.63	0.54	0.71	115.28*	
Combination	7	0.49	0.36	0.61	34.89*	
Post-tests						17.86*
Standardized test	12	0.37	0.26	0.48	29.56*	
Experimenter developed test	60	0.63	0.55	0.70	129.69*	
Instructors						10.95*
Classroom teachers	12	0.43	0.33	0.53	54.68*	
Researchers	32	0.64	0.55	0.74	35.34	
Research assistance	19	0.49	0.31	0.69	44.12*	
Others	9	0.56	0.33	0.79	32.02*	
Strategies used						34.93*
Direct Instructions	41	0.45	0.37	0.53	89.35	
Reciprocal teaching	10	0.45	0.29	0.61	27.41	
Generative learning	7	0.87	0.57	1.17	8.11	
Graphics/visual/imagery	7	0.96	0.66	1.26	6.22	
Self-instruction and verbalization	5	0.78	0.52	1.04	8.84	
Questioning	2	0.30	-1.56	2.17	2.25	
Methods of Assignment to groups						0.42
Stringent	43	0.51	0.42	0.59	80.72*	
Less stringent	28	0.55	0.46	0.63	95.85*	
Length of Treatment						15.54*
<15 days	40	0.48	0.40	0.56	97.88*	
15-25 days	11	0.63	0.47	0.79	37.36*	
>25 days	10	0.37	0.17	0.57	17.20*	
No information	11	0.78	0.59	0.98	9.14	
Sample Size						2.59
1-45	48	0.56	0.48	0.64	125.22*	
46-100	18	0.45	0.33	0.57	40.54*	
>100	6	0.55	0.35	0.74	8.77	
Transfer test						5.14
Yes	12	0.42	0.26	0.58	37.72	
No	13	0.54	0.37	0.71	18.75	
0.99 (No information)	19	0.64	0.51	0.73	37.10	

In the next stage of the meta-analysis, effect sizes from each of the primary studies with the same constructs were averaged to yield one effect size from each study. In other words, an independent effect size was created, for example, multiple measures

of reading comprehension from each study, were averaged so that the sample on which they are based contributes only one mean effect size to the distribution.

3.2.6 Identifying Independent Hypothesis Tests

In quantitative synthesis, a decision must be made about whether or not each hypothesis test should be considered as an independent event (Cooper, 1984). Identifying independent hypothesis test was made difficult due to the fact that most primary studies reported different methods of analysis with different measures to evaluate the same construct. Different researchers used students from different grade levels and ability group and reported the results separately in a single study. Therefore, some of the studies contribute either two or three effect sizes in a single study while other researches contributed only one effect size. The inclusion of multiple effect sizes from one study might violate the assumption of independent observation, because 'multiple effect sizes' from one study cannot be regarded as independent' (Bangert-Brown, 1986).

This meta-analysis was based on study characteristics, where in the first stage, multiple effect sizes measures from a single study from the same group of participants were first coded as if it was independent. Mean weighted effects sizes were combined and computed to test whether the assumption of homogeneity of variance is met or whether they appear heterogeneous. In the second stage of the meta-analysis, effect sizes from multiple measures administered to the same group of students were averaged to yield a single effect size for that sample of students according to the construct they represent. This approach was described as a two–stage meta-analysis that shifts its units of analysis (Cooper, H., 1998; Johnson., B.T., and Eagly, A.H., 2000) and has the advantage of avoiding statistical dependence caused by multiple

effect sizes from the same study (Hunter and Schmidt, 1990). The shifting unit of analysis approach is a compromise which allows studies to retain their maximum information value while keeping to a minimum any violation of the assumption of independence of hypothesis tests (Cooper, 1984).

Study outcomes were divided into various groupings specified by moderators and would permit information for a group of study participants to appear more than once to examine the differences across the moderators (Johnson and Eagly, 2000). For example, in the analysis by outcome measures, each study contributed only one effect size for each type of measure.

The effect sizes were not strongly homogeneous and further analysis of the qualitative and quantitative features of the studies were used to develop reliable estimates. The possible moderator's variables were tested using Homogeneity analysis. Twelve moderator variables were identified *a priori*:

a. Publication characteristics: year and type,
b. Subjects characteristics; Grade and student ability level
c. Instructional variables; type of reading materials used, post-tests measures, instructors, and strategies used.
d. Design characteristics; methods of assignment, duration of the treatment in days, number of sessions and sample size.

Accordingly the hypotheses were,

a. Publication:

Published studies reported in the journal will report larger effect sizes than unpublished studies such as thesis and dissertation. This relates to the publication bias, which is the tendency for authors to submit and journal editors

not to accept for publication studies that fail to achieve statistically significant results.

b. Subjects: Grade and ability level

A reasonable hypothesis is that the instructional effects of treatment with metacognitive strategies would be higher for younger or lower grade levels and those from low ability groups. A meta-analysis conducted by Haller et al (1988) shows that the effects of the treatment were highest on the junior high students (seventh to eight grades). The effects of the treatment would not be equally beneficial across the populations. For instance, Studies by Lederer (2000) and Miranda (1997) indicated that the learning disabled students gained significantly from the metacognitive strategies whereas the high ability students in a study by Hare and Borchardt (1997) did not benefit from the treatment.

c. Instructional variables:

Type of reading materials used;

The use of the metacognitive strategies would be more effective for the subjects reading the narrative texts than those using the expository texts.

Types of Post-tests measures; Post-tests measures developed by the experimenter could be more effective than standardized tests in the assessment of students reading comprehension.

The instructors; The treatment effect would be greater when the researchers were involved in the training of the strategies, than those conducted by the classroom teachers or the research assistant.

Strategies used; Previous meta-analysis by Rosenshine and Meister (1994) on reciprocal teaching had demonstrated that this instructional procedure gave a large impact of 0.88 when experimenter developed tests and 0.32 when standardized tests were used to teach students' cognitive strategies that might lead improved reading comprehension. Besides the result were the same whether the students were taught 2, 4 or 10 strategies. In other words, depending on the type of post-tests measures used, the outcome would be positive if more than a single strategy was used.

d. Design characteristics:

Methods of Assignment: Studies with 'stringent methods of assignment' to group would produce higher effect sizes than the 'less stringent methods of Assignment'.

Duration of the treatment: The duration of an intervention is a significant factor in the practical significance of an intervention. It was hypothesized that the duration of the treatment would have a significant effect on the results of the treatment, the longer the treatment or the more the training sessions, the treatment effect might be positive and effective.

Sample size: Sample size is the most important feature to identify publication bias. According to Begg, C.B., (1994), small studies produce highly variable effect size estimates, and that the most aberrant values that occur by chance are much farther from the true mean effect size than the aberrant values for large studies. Therefore, if selective publication causes the more extreme effect

sizes to be selected for publication, regardless of the sample size, then the effect sizes from the small studies will be more extreme than those form the larger studies.

(i) Creating an Independent set of Effect sizes

Before any further analysis, effect sizes from each of the primary studies with the same constructs were averaged to yield one effect size from each study. For example, the effectiveness of metacognitive strategies might present two outcome constructs such as reading comprehension and vocabulary. Multiple measures of reading comprehension from each study were averaged so that the sample on which they are based contributes only one mean effect size to the distribution. As a result of removing the effect sizes with extreme values and deviant effects and creating the independent effect sizes, there were about *44 effect sizes out of 24 studies* left. The mean effect size is computed, by weighting each effect size by the inverse of its variance. The mean effect size for this study was *d=0.55 (95% CI 0.48 to 0.62).*

Heterogeneity	*df*	*Prob(Chi-Square)*
Qtotal 93.72	*43*	*0.00001*

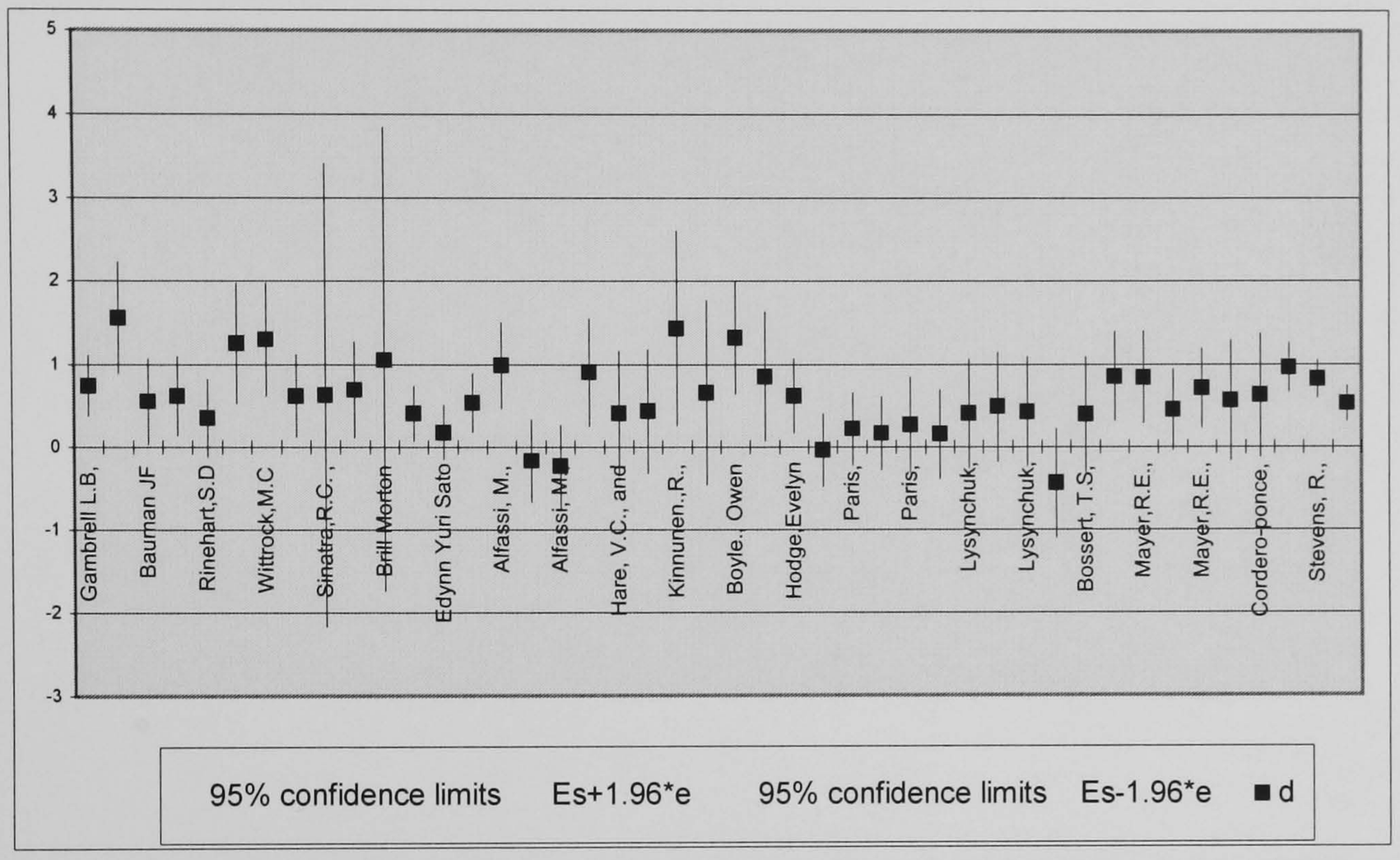
Mean Effect Size	*95% CI*
E++ 0.55	*0.48 to 0.63*

(ii) Determine Confidence Interval for the mean

Confidence Interval for each of the mean effect size from each study was computed to indicate the degree of precision of the estimated effect size. The summary of data with 95% Confidence Intervals and effect sizes are illustrated in the figure below. If the confidence interval does not include zero, the mean effect size is statistically significant at the level specified by the confidence interval (that is, α=.05

statistically significant at the level specified by the confidence interval (that is, α=.05 for a 95% confidence interval). The figure illustrated that 23 (52.27%) out of 44 effect size distribution were significant at *.05* level.

Figure 7 Individual effect sizes with 95% Confidence Intervals (CI)



*(**The** 95% confidence intervals were plotted using: ES + 1.96 * e and ES – 1.96 *e*

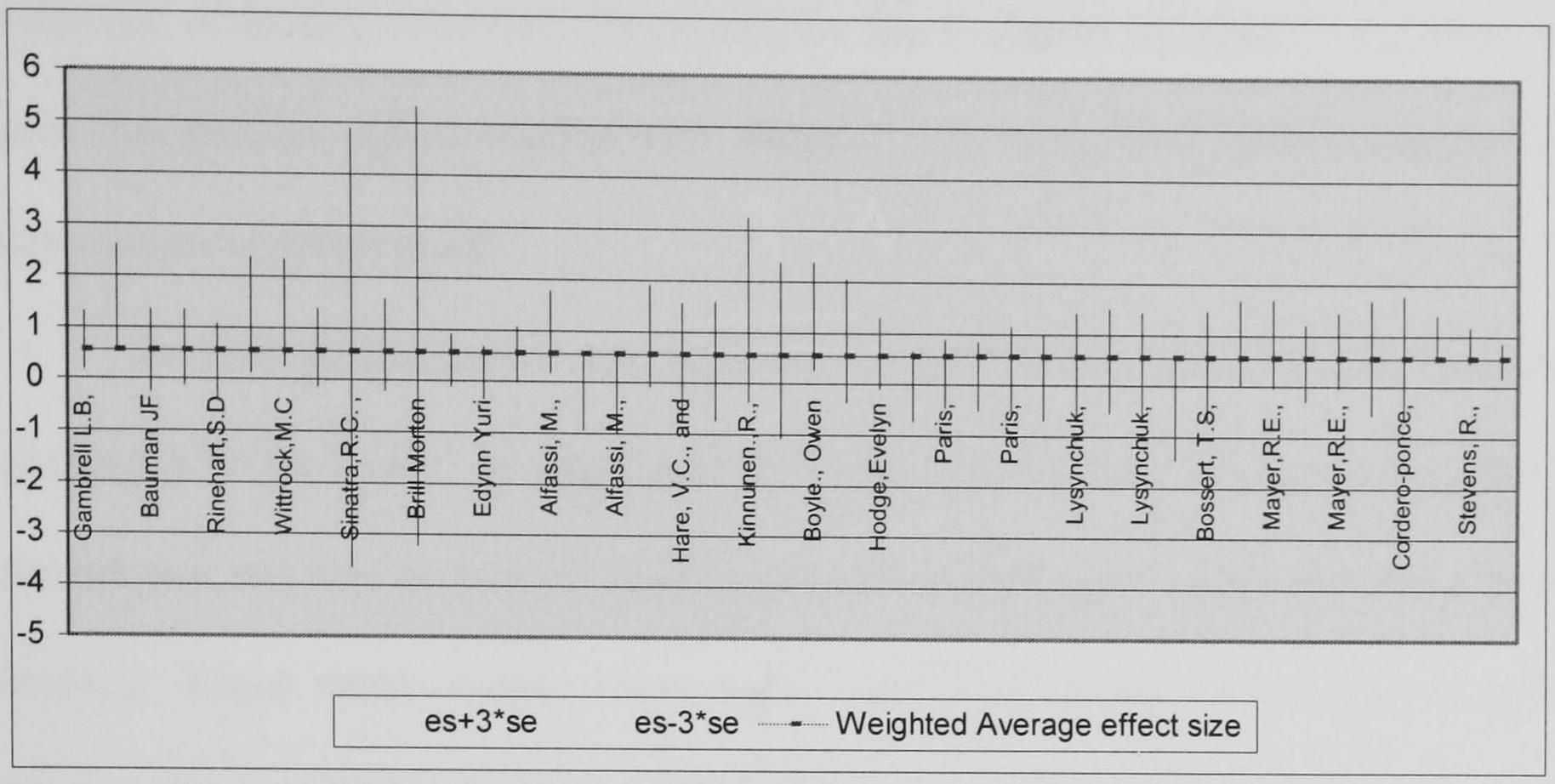
***Notes: 'e' is the standard error for ES using the formula; SE for ES* = $\sqrt{\frac{d^2}{2(n_E + n_c)} + \bar{n}}$

$= \sqrt{v} = e$*)* (Hedges and Olkin, 1985, P.89)

(iii) Test for homogeneity of distribution

A statistically significant Q [*Qtotal=93.7218, df=43, prob (chi-square) = 0.00001]* in the above table indicates a heterogeneous effect size distribution that might need additional analysis. Following Hedges, L.V., Shymansky J.A., and Woodworth, G., (1989) suggestions, the effect sizes were plotted with three sampling standard errors to screen a group of studies for heterogeneity. About 8 effect sizes did not cover the weighted average of d=0.55. The error bars of the deviant effects failed to cover the weighted average effect size.

Figure 8 Individual Effect Sizes Plotted with Three Sampling Standard errors



Further examination of the heterogeneity distributions is needed to find answers regarding their deviations. The effect size heterogeneity might be due to the systematic sources explained by the coded variables. Further analysis was necessary to explore the possible causes for the excess variation. In this investigation, analysis of heterogeneous distributions of effect size will be conducted using *Fixed effects model: Analog to the Analysis of variance.*

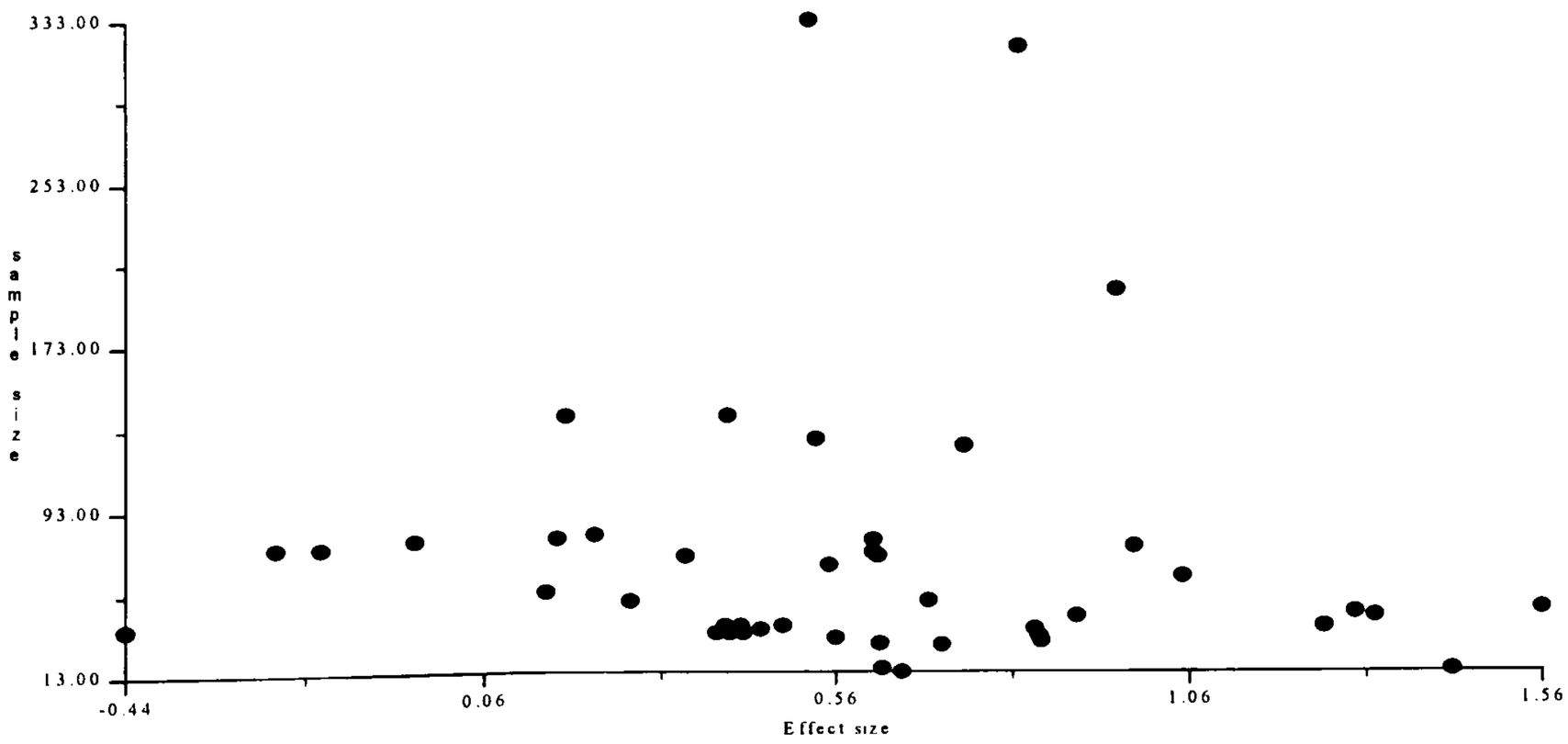
3.2.7 The search for Publication bias

Most studies have considerably demonstrated that statistically significant results are more likely to be published than studies reporting less significant results. This might lead to publication bias. Rosenthal dubbed this phenomenon as the file-drawer problem where unpublished studies ended up in investigators' files (Greenhouse, J.B., and Iyengar. S., 1994). In many cases, the decision to publish was influenced by the presence or absence of a statistically significant effect, with significant results more likely to be published (Begg, 1994). If this meta-analysis was restricted to published studies, there is a risk that it will lead to a biased conclusion.

This meta-analysis however was not restricted to published studies because the selection of studies followed the criteria for the inclusion as already described in the previous section. Most studies were dropped due to the lack of information for the calculation of effect sizes.

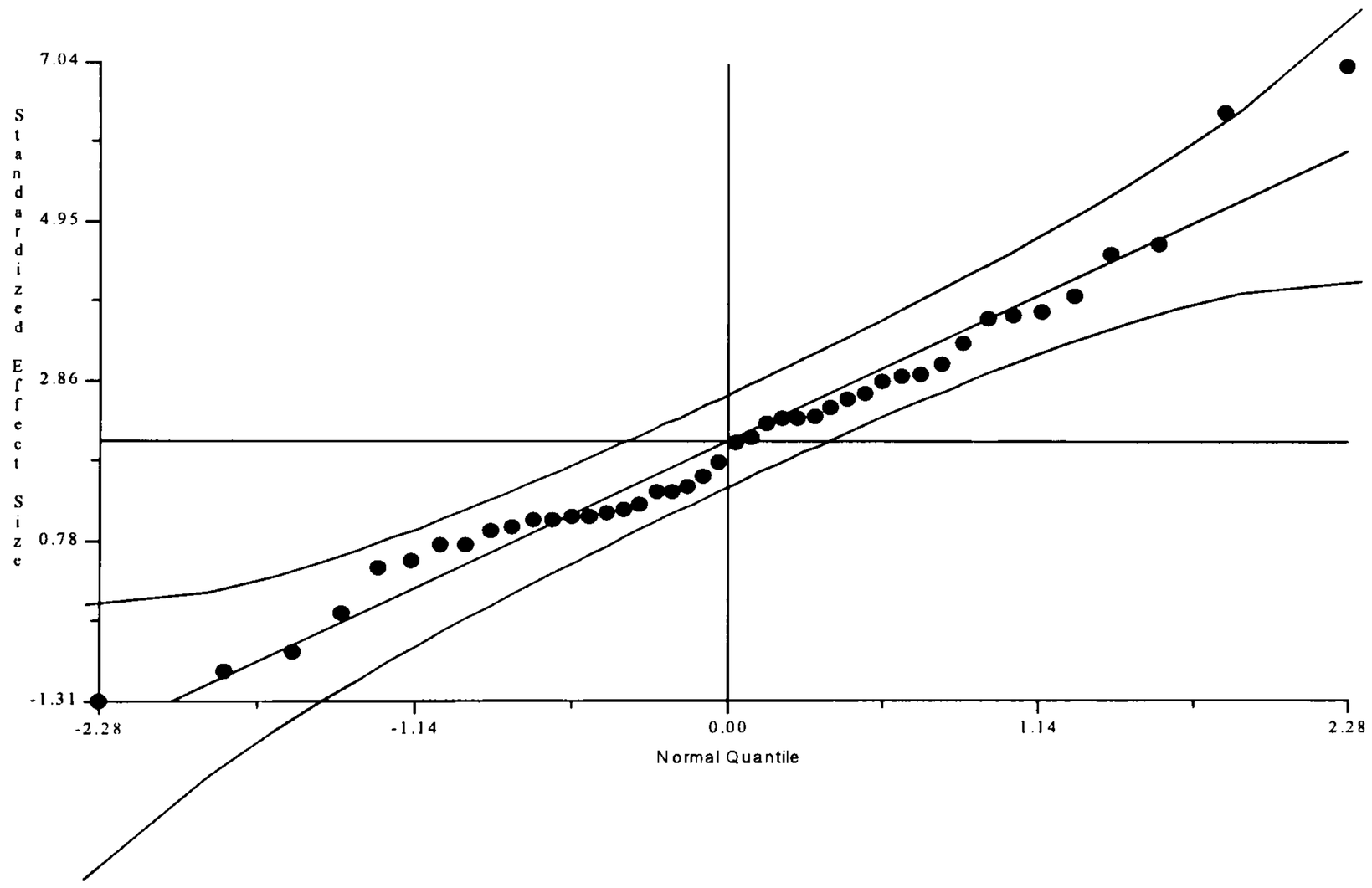
In this investigation, the presence of publication bias will be assessed by plotting a "funnel plot" as suggested by Light and Pillemer (Begg., C.B., 1984). A funnel plot is a scatter plot of sample size versus estimated effect size for a group of studies. Since small studies show more variability among effect sizes than larger studies, there will be fewer of a latter. According to Begg, C.B., (1984), if no bias is present, this plot should be shaped like a funnel, with the spout pointing up, that is, with a broad spread of points for the highly variable small studies at the bottom and decreasing spread as the sample size increase. When there is a publication bias against studies showing small effect sizes, a bite will be taken out of a part of this plot.

Figure 9 Funnel plot



Alternatively, Wang and Bushman (1998) suggest the normal quantile plot to search for publication bias and investigate whether all studies come from a single population. The figure below depicts the results of meta-analysis with 24 studies on metacognitive strategies in reading comprehension. The data seems to be normally distributed on a straight line and within the 95% confidence bands except for a slight deviation of a dot which might indicates that the population are heterogeneous. However, there is no suspicious gap or asymmetric distribution that might reflect publication bias.

Figure 10 Normal quantile plot



A further investigation using formal statistical tests was performed to explore publication bias. Begg (1994) suggested a rank correlation test, a statistical analogue to a funnel plot, to search for a relationship between the standardized effect size and sample size across studies. A significant correlation between the two variables might indicate publication bias where larger effect sizes in one direction (e.g., positive

effects) are more likely to be published than smaller effects. The correlation between standardized effect size and sample size, using *Kendall's tau and Spearman's rho* was calculated, there is no significant correlation between these two variables.

RANK CORRELATION (Effect vs. Sample Size)

Kendall's Tau

Tau -0.137
Z -1.307
Prob 0.19117

Spearman Rank-Order Correlation

Rs -0.177
Prob 0.25068

However, according to Rosenthal et al. (2000), this test cannot detect publication bias in which larger effect sizes are more likely to be published than smaller effect sizes regardless of direction. Furthermore, there are only 24 studies, and the test can be quite powerful when the number of studies reaches 75 or more (Rosenthal et al., 2000).

Generally, the use of graphical techniques plus the statistical tests to detect publication bias in this study might provide the evidence that *publication bias* is unlikely in this meta-analysis. The was no significant different between the effect sizes from the Journal articles and Unpublished dissertations in this meta-analysis. The effect sizes were 0.59 for Journals and 0.44 for the unpublished dissertations. The next section will discuss on the results of *Analog to the Analysis of Variance* to analyze the heterogeneity distribution of effect sizes as indicated in the previous homogeneity analyses.

3.2.8 Analog to the Analysis of variance

This is a technique that groups effect sizes into mutually exclusive categories on the basis of an independent variable and tests the homogeneity among the effect sizes within the categories and the differences between the categories. If the between category variance is significant, the mean effect sizes across groups differ by more than sampling error. If the pooled within groups variance is homogeneous, it indicates that there is no further variation among effect sizes other than subject level sampling error. (Lipsey, M.W. and D. B.Wilson , 2001).

Analog to ANOVA partitions the total homogeneity statistic Q, into the portion explained by the categorical variable (Q_B) and the residual within group portion (Q_W). *The* $Q_{B\ is}$ an index of the variability between the group means and Q_W is an index of the variability within the groups. If $Q_{B\ is}$ statistically significant, the mean effect sizes across the categories differ by more than sampling error. It has an approximate chi-distribution with p-1 degrees of freedom, where p is the number of classes. If Q_B is greater than the critical value, it indicates a significant difference among the classes of effect sizes. This tests also indicates whether the pooled within groups variance is homogeneous. If the Q_W is not statistically significant, the categorical variable represented in Q_B is sufficient to account for the excess variability in the effect size distribution (Lipsey, M.W. and Wilson D.B., 2001).

The first step in the computation of an analog to the ANOVA is to calculate the homogeneity statistics Q for each category. This is followed by computing the pooled within groups homogeneity statistics for each category (Q_W). The between group homogeneity statistics (Q_B) is the weighted sum-of-squares of the mean effect size for each category around the grand mean effect size. Since *QB and Qw* partition the total Q (Q_T), Q_B can be solved through subtraction as

$$Q_B = Q_T - Q_w,$$

$Q_{T\ will}$ represent the 'total fit'. The total fit or QT is the total sum of between and within class components._ The simple relationship between the fit statistics Q_B, Q_w, and Q_T is analogous to the partitioning of the sum of squares in the analysis of variance, namely, that

$$Q_T = Q_B + Q_w$$

The statistics Q_B, Q_w, and $Q_{T\ are}$ distributed as chi-square variables. The relationships are summarized in the table below.

Source	Statistics	Degrees of freedom
Between classes	Q_B	$P - 1$
Within classes	Q_W	$K - p$
Total	Q_T	$K - 1$

(Hedges and Olkin, 1985, p-156)

The technique used would be quite direct. The studies with similar characteristics were grouped and averaged to test for the homogeneity of effect sizes within classes and for differences in effect sizes between classes. A large Q_w indicates that the effect sizes are not homogeneous within classes and the within class fit statistic $Q_{w\_}$ were partitioned into p statistics $Q_{w\ i}$, i = 1,….,p,……Examining the values of Q_w may help to identify classes with Low ability fit, that is, classes in which the effect sizes are heterogeneous (Hedges and Olkin, 1985). If the within class fit is not rejected, the process of subdividing into groups or series of studies will stop. However, if the within class-fit is rejected, then the classes are subdivided further. The process of subdividing and testing for between and within class fit continues until an acceptable level of within class homogeneity is achieved (Hedges and Olkin, 1985).

The next section will present the results of the Analog to the ANOVA. Several features that did not have enough data or information for comprehensive analysis were dropped out. The most incomplete information was those from the *location of school* where more than 50% of the studies did not provide the information on the location of the treatment.

3.2.9 ***Results of Study features analyses (Analog to the analysis of variance)***

(i) Overall effect size estimate

The overall effect size estimate in this study was *d=0.55 (95% CI; 0.48 to 0.63) and the Q value was; 93.72, df= 43, prob (chi-square); 0.00)*. A breakdown analysis of the studies outcome was positive for reading comprehension (*d=0.58, Q; 62.74, df=35, 95% CI; 0.50 to 0.66)* and whereas the treatment effect for vocabulary test was negative *(d=-0.07, Q; 4.05, df= 3, 95% CI; -0.49 to 0.38)*. The outcome for studies using *essays* to measure the treatment effect on reading comprehension was *d= 0.91, Q;* 2.52, df=3, *95% CI; 0.36 to 1.45).*

Table 2 Overall effect size estimates and outcome measures

	No. of studies	Mean effect size	95% Confidence Interval for *d*			
	K	*d*	*Lower*	*Upper*	*QT*	
Overall effect size estimate	44	0.55	0.48	0.63	93.72*	
Outcome					Q_W	Q_B
						24.41*
Reading comprehension	36	0.58	0.50	0.66	62.74*	
Vocabulary	4	-0.06	-0.49	0.38	4.05	
Writing	4	0.91	0.36	1.44	2.52	

The statistically significant Qt indicates that one or more factors other than chance or sampling error account for the heterogeneous distribution of effect sizes for the effects of metacognitive strategies on comprehension. As a result, cases associated with large Q values were further examined using the study features or study characteristics to explore the causes for the excess variance in dependent variable, reading comprehension. The statistically significant values of Qw (within-group chi-square statistic) associated with reading comprehension indicate that further grouping was necessary. The homogeneity of variance for vocabulary comprehension and essays were not violated, no further analysis was pursued for this variable.

Partitioning of studies with key variables such as grade and ability level and text variables were related to developmental theory of metacognition and schema theory as highlighted in the literature. Further grouping of studies were also made by stratifying studies on key methodological features so that the comparison of interest made between studies were 'matched' on key methodology.

In the next section, the first category to be analysed was the publication characteristics that includes the type and year of publication.

(ii) Publication

It was hypothesized that Published studies reported in the journal will report larger effect sizes than unpublished studies such as thesis and dissertation. Although the results revealed that the effects were moderate for journals (d=0.58, K=27, Qw46.00) and dissertations (d=0.49, K=5, Qw= 9.58), whereas the ERIC documents yielded a large effect size (d=0.99, K=4, Qw=1.81), the difference was not statistically significant. The statistically significant Qw value suggests the need for further grouping for Journals'

category to further understand the related moderators that account for the variability in effect size.

Publication type. The homogeneity test indicated that the variation in effect sizes was not significantly associated with this variable, $Q_B{}^{(2)}{}_{=5.35}$. Out of a total 36 effect sizes, 75% were from journal articles, 11.1% were from ERIC documents and 13.8% were from dissertations. The mean effect size reported for the ERIC documents was large, d=0.93 (df=3, 95% CI; 0.34 to 1.52) followed by moderate effects from journals, d=0.58, (df=26, 95%CI; 0.49 to 0.68) and dissertations d=0.44 (df= 4, 95% CI; 0.16 to 0.73), however the difference was not statistically significant.

The significant *Qw* value from the journal articles suggests the need for further grouping. The box plot indicated three outliers from this category. It is possible that it was the characteristics of the population that might account for the variability in the observed effect sizes. The three studies includes effect sizes from the studies by *Alfassi, M., (1998) [3] = d-0.23* conducted with the non-English speaking culture in Israel in the remedial reading classes, *King, C.M. (1999), d= 0.9581*, with heterogeneous group of students such the learning disabled, special needs, and regular education students and finally from *Miller, G.E., (1985) d=1.56* with the younger children from grade 4. With the exclusion of these three studies from the distribution, the effect size was *modest d=0.56 and homogeneous (K=24, Qw=21.19).*

Table 3

Pub Type Category: Journal articles=1, Eric documents=2, Thesis/dissertation=3

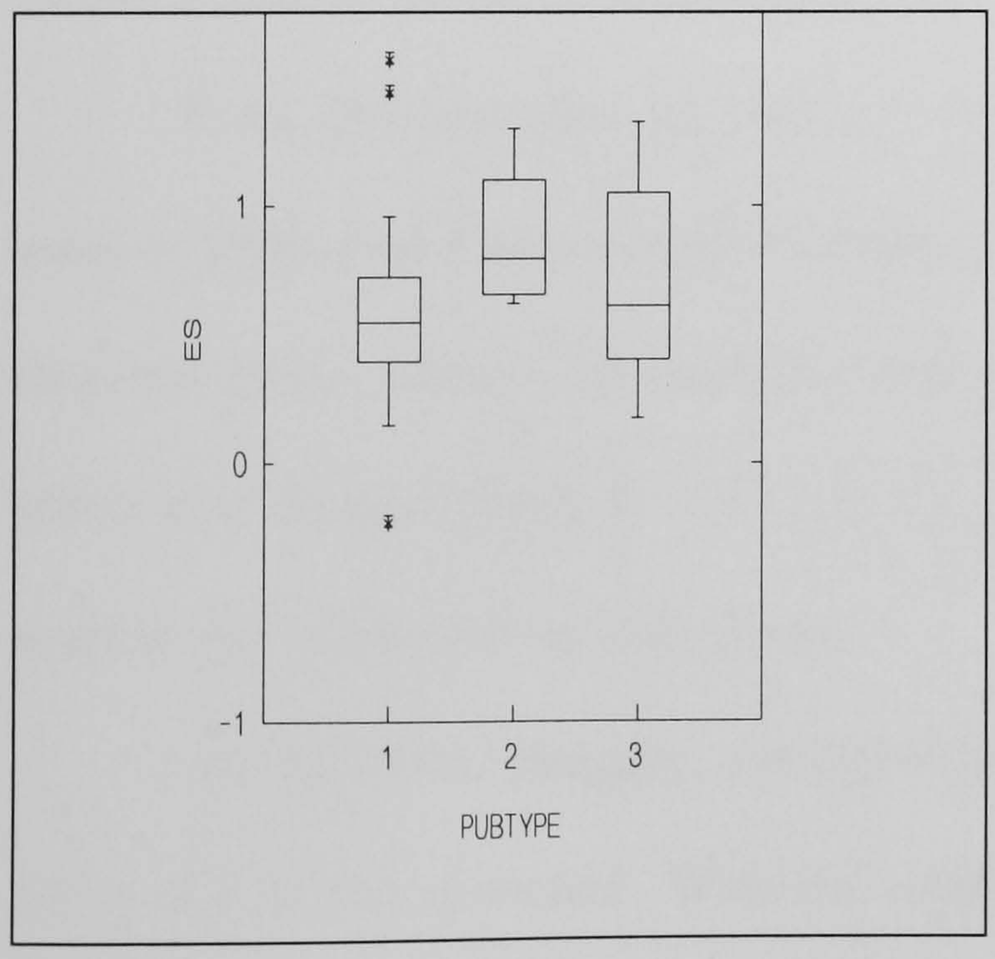
Publication type	#Studies	Qw	df	Prob (Chi-square)
Journal	27	46.00	26	0.01
Eric	4	1.81	3	0.61
Dissertations	5	9.58	4	0.05

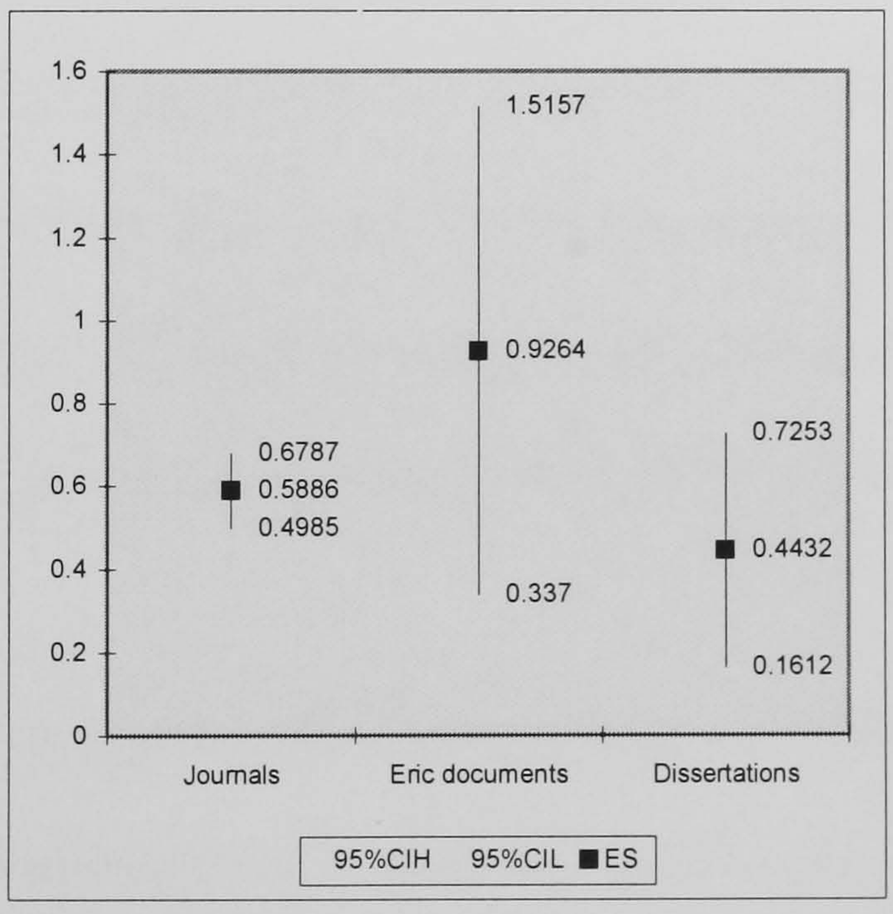
Model	df	Q	Prob(Chi-Square)	Prob(Rand)
Between	2	5.346	0.069	0.31
Within	33	57.39	0.01	
Total	35	62.74	0.00	

-Mean Effect Sizes--

Pub.type	Studies	E+	df	95% CI	Bootstrap CI	Bias CI
Journal	27	0.59	26	0.49 to 0.68	0.46 to 0.71	0.46 to 0.71
Eric	4	0.93	3	0.34 to 1.52	0.69 to 1.26	0.69 to 1.28
Dissertations	5	0.44	4	0.16 to 0.73	0.25 to 0.84	0.25 to 0.84

Figure 11: Box plot and 95% CI plot of standardized mean difference, d, for the three type of publication
(1=Journal, 2=Eric documents. 3, Dissertations)





Partitioning the Journal articles' category into ability group

Further grouping of the Journal articles' category into ability group revealed that the mean effect sizes were highest when the treatment were conducted with *the Mixed ability group, d=0.70, (K=13, Qw=11.54), followed by Low ability*

group, d=0.50, (K=8, Qw=12.57), Average group, d=0.399, (K=6, Qw=14.86) and the High ability group, d=0.40, (K=1, Qw=0.00). As expected, the instructional effects of the treatment with metacognitive strategies would be higher for students from the low ability and learning disability group.

Publication Year. The homogeneity statistic associated with the year of publication was not significant, *QB (2) =0.86*. This variable was divided into three time periods; *1980s, 1990s and 2000.* The effects were equally moderate, where the effect sizes were *d=0.52(K=14, Qw=23.92)*, d=0.60*(K=19, Qw=37.91) and d=0.54 (K=3, Qw= 0.05)* for the three time periods. Even though the effects in the 1990s were slightly greater, the difference was not statistically significant. The test revealed that the within class value *(Qw)* of 1980s and 1990s were significant, indicated that these variables were significantly associated with the variation in effect sizes. Further grouping were made for these two categories, even though the difference might also be due primarily to the influence of an 'outlier' within each of the categories.

From the box plot, an outlier was detected within the distribution of effect sizes in 1980s and it was a study by Miller, G.E (1985), where *d=1.56*, the same study detected earlier within the Journal's category. With the removal of this study, the effect size dropped from *d= 0.53, (K=14, Qw=23.92)* to *d=0.47, (K=13, Qw=14.47) and the Qw value was not significant.*

In the 1990s category, a study with a negative effect from *Alfassi, M., (1998) [3] = d-0.23 was detected.* With the removal of this study from the distribution, the effect size increased from *d=0.60, (K=*19, Qw=37.91) *to d=0.63 (K=16, Qw=22.96).* The Qw value dropped to non-significance level and the effect size was homogeneous.

Table 4

Year of Publication category; 1980s, 1990s and 2000

--Heterogeneity--

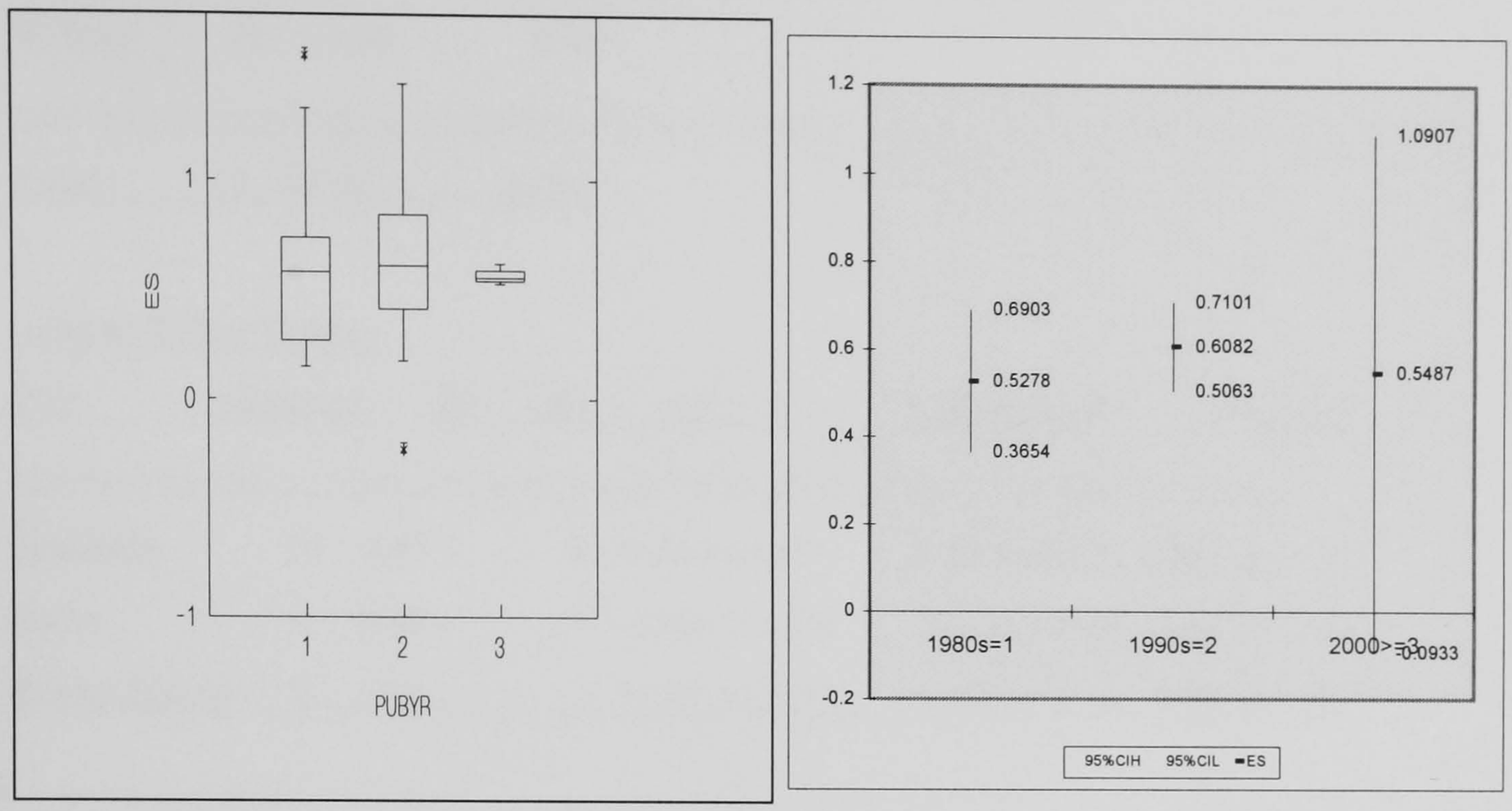
Pub.Yr	#Studies	Qw	df	Prob (Chi-square)
1980s	14	23.92	13	0.03
1990s	19	37.92	18	0.00
2000>	3	0.05	2	0.98

Model	df	Q	Prob(Chi-Square)	Prob(Rand)
Between	2	0.86	0.650	0.84
Within	33	61.88	0.00	
Total	35	62.75	0.002	

--Mean Effect Sizes--

Pub.Yr	#Studies	E+	df	95% CI	Bootstrap CI	Bias CI
1980s	14	0.53	13	0.37 to 0.69	0.35 to 0.73	0.36 to 0.76
1990s	19	0.61	18	0.51 to 0.71	0.45 to 0.76	0.46 to 0.76
2000>	3	0.55	2	-0.09 to 1.19	0.53 to 0.62	0.53 to 0.60

Figure 12: Box plot and 95% CI plot of standardized mean difference, d, for Publication Year
(1=1980s, 2=1990s. 3=2000>)



Partitioning 1980s, into type of publication

The first time period, 1980s were further subdivided into type of publication, Journals, Eric and Dissertations. The effects were d=0.47, (K=10, Qw =17.84), d=0.68 (K=2, Qw =0.00) and d=1.30 (K=2, Qw=0.03) for Journal, Eric and dissertations. With the removal of an 'outlier' from the Journal's category, the effect size dropped to d= 0.41 (K=9, Qw=7.28) and the *Qw* value was not significant.

Table 5

Partitioning 1980s; Journals, ERIC and Dissertations

--Heterogeneity--

Pub	#Studies	Qw	df	Prob (Chi-square)
Journals	10	17.85	9	0.04
Erics	2	0.00	1	0.96
Dissertations	2	0.03	1	0.85

Model	df	Q	Prob(Chi-Square)	Prob(Rand)
Between	2	6.04	0.049	0.19
Within	11	17.88	0.08	
Total	13	23.92	0.032	

--Mean Effect Sizes--

Pub	#Studies	E+	df	95% CI	Bootstrap CI	Bias CI
Journals	10	0.47	9	0.29 to 0.65	0.28 to 0.70	.2891 to 0.71
Erics	2	0.69	1	-3.00 to 4.39	0.62 to 0.69	0.62 to 0.69
Dissertations	2	1.31	1	-3.01 to 5.62	1.05 to 1.32	1.05 to 1.32

Partitioning 1990s, into type of publication

The second time period, 1990s was further subdivided into type of publication. The effects were highest for ERIC documents (d=0.90, K=1, Qw=0.00), followed by Journal articles (d=0.65, K=13, Qw=24.66) and dissertations (d=0.35, K=3, Qw=2.44). The Q value was consistently homogeneous among all the three type of publication.

(iii) Subject characteristics: Grade and ability level

A reasonable hypothesis is that the instructional effects of treatment with metacognitive strategies would be higher for younger or from lower grade levels or from the Low ability groups.

Grade Level. The homogeneity test revealed that this variable was significantly associated with the variation in effect size where QB (5) =12.21. The effects were highest with the samples in the category of 'others', d=1.25 (K=2, Qw = 0.21), followed by college, d=0.72 (K=8, Qw = 5.00), younger students from Grade 2-3, d=0.68,(K=6, Qw)=11.34, Grade 4-6, d=0.55, (K=15, Qw= 28.05), Grade 7-9, d=

0.46 (K=2, Qw=0.18) and finally students from Grade 10-12, d=0.23, (K=3,Qw = 5.75). Except for categories from Grade 7-9, 10-12, and others, all weighted effect sizes were significant.

The hypothesis that the instructional effects of treatment with metacognitive strategies were higher for younger students or from lower grade levels might be true. The within sample effect sizes constituting the aggregation of 'others' were from *Wittrock, M.C., (1991) [1, 2] and Sinatra, R.C., et al., (1984).* The treatment group from Wittrock, M.C., (1991) consists of the *Low ability young adult readers* from the army camp, whereas Sinatra, R.C., et al., (1984) have chosen the *low ability readers or youngsters ranging from 2nd to 8th grades.*

Besides, box-plot also detected an outlier within each of the Grade 2-3, and Grade 4-6 categories. One study indicated as outlier from the box plot within the Grade 2-3 category was a study from King, C.M., (1999). The treatment was conducted with a heterogeneous group of 200 students from special needs to regular education group. Without this study, the effect size was d=0.44, and the Q value dropped to non significance level (K=5, Qw=4.95).

Another outlier within the aggregation of studies in *Grade 4-6* category was from Miller, G.E., (1985) where the treatment was conducted on less than 45 groups of Average students. Without this study, the effect size within this category was d=0.52, and the Q value was nonsignificance (K=14, Qw=19.17).

Partitioning Grade 2-3, into ability group

Further subdivision was made within the studies with high Q values. The first category of students from Grade 2-3, d=0.68 (K=6, Qw=11.35) were subdivided into ability group. The highest effect were from the Poor/Low ability group d=1.03, (K=2,

Qw=0.47), followed by the Mix ability group, d=0.96, (K=1, Qw=0.00), and the Average group, d=0.35, (K=3, Qw=1.75).

Partitioning Grade 4-6, into ability group

Grade 4-6 category (K=15, Qw=28.0548) was also subdivided into ability groups. The effects were equally moderate for the Poor/Low ability (K=4, d=0.65, Qw=1.78), and Mix ability group (K=6, d=0.62, Qw=5.55), and smaller effect for the Average group (K=5, d= 0.35, Qw=14.74).

The effect size from the Average group dropped to d=0.24, (K=4, Qw=1.29) when a study by Miller, G.E., (1985) identified as an outlier within this category was removed from the distribution. This might suggest that the metacognitive strategies were more effective for the Low and Mix ability group.

Table 6
Grade Level category (Grade 2-3=1, 4-6=2, 7-9=3, 10-12=4, college=5, others=6)

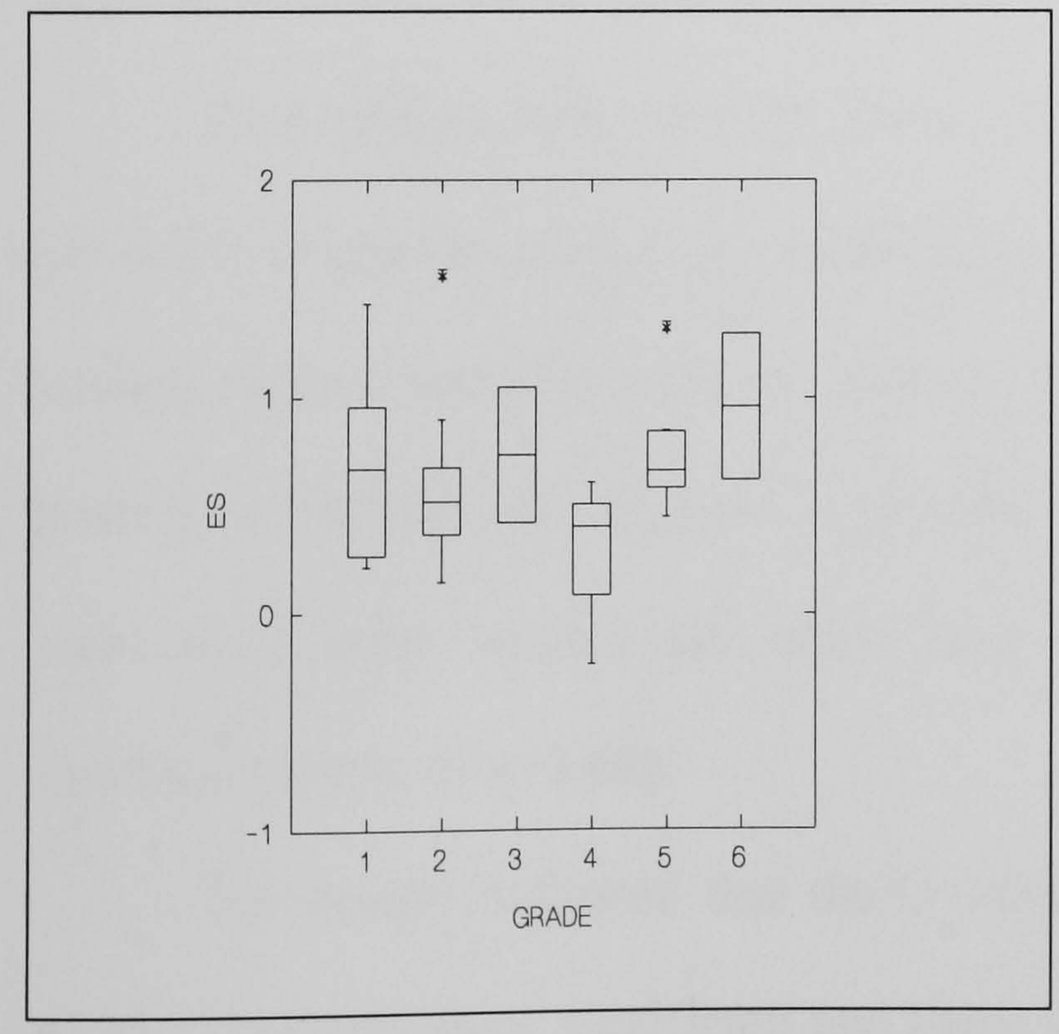
--Heterogeneity--				
Class	#Studies	Qw	df	Prob (Chi-square)
4-6	15	28.05	14	0.01
Others	2	0.21	1	0.65
10 -12	3	5.75	2	0.06
2 -3	6	11.35	5	0.05
7 -9	2	0.18	1	0.67
College	8	5.00	7	0.66

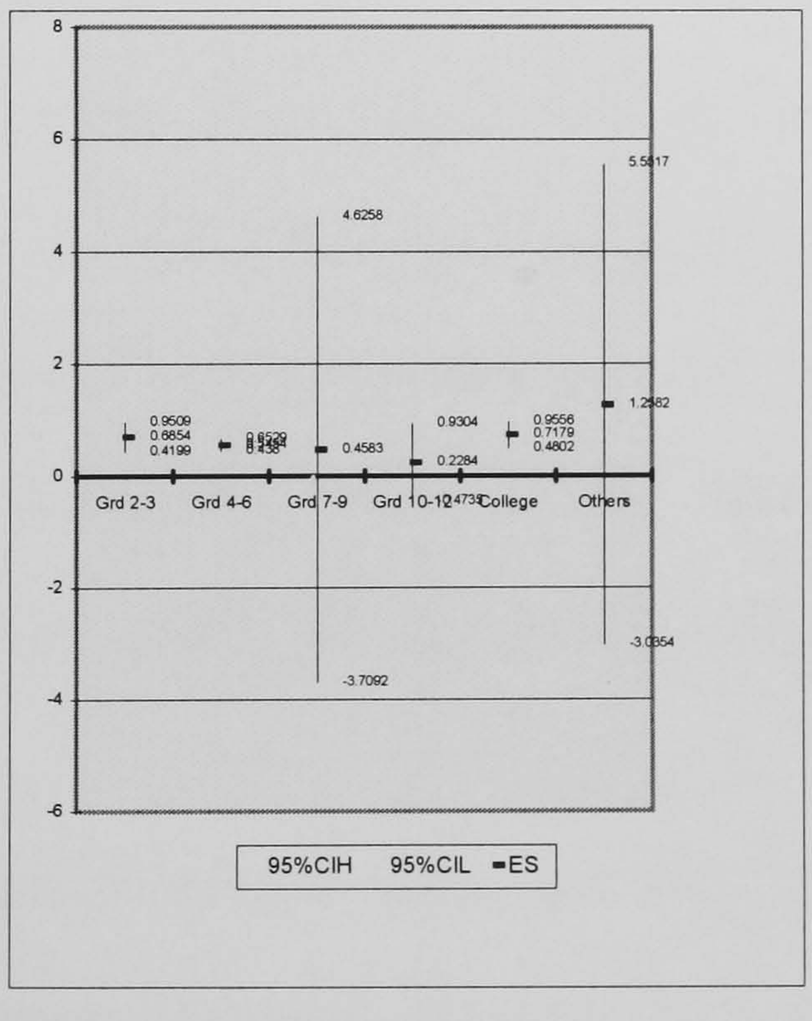
Model	df	Q	Prob(Chi-Square)	Prob(Rand)
Between	5	12.21	0.03	0.36
Within	30	50.54	0.01	
Total	35	62.75	0.00	

--Mean Effect Sizes--

Class	#Studies	E+	df	95% CI	Bootstrap CI	Bias CI
4-6	15	0.55	14	0.44 to 0.65	0.40 to 0.68	0.42 to 0.70
Others	2	1.26	1	-3.04 to 5.55	0.62 to 1.30	0.62 to 1.30
10 -12	3	0.23	2	-0.47 to 0.93	-0.23 to 0.61	-0.23 to 0.61
2-3	6	0.69	5	0.42 to 0.95	0.31 to 0.94	0.31 to 0.94
7-9	2	0.46	1	-3.71 to 4.63	0.43 to 1.05	0.43 to 1.05
College	8	0.72	7	0.48 to 0.96	0.59 to 0.90	0.59 to 0.88

Figure 13: Box plot and 95% CI plot of standardized mean difference, d, for different Grade Level
(Grade 2-3=1, 4-6=2, 7-9=3, 10-12=4, college=5, others=6)





Ability group. This variable was significantly associated with the variation in the observed effect size distribution, QB (2) = 11.41. The effect was highest with the Mixed ability group (K=15, d=0.69, Qw=14.94) followed by the Low ability group

(d=0.58, K=11, Qw=18.73) and the Average group (d=0.37, K=9, Qw=17.45). All weighted effect sizes were significant (95% Confidence Interval). The effects differed significantly among students from different ability groups.

The box plot detected an outlier in each of the Mixed ability group and the Average group, and two outliers in the Low Ability group. An outlier from the Mixed ability group was from *King, C.M., (1999), with effect size, d=0.95.* The study was conducted on heterogeneous group of students such as the learning disabled, special needs, and regular education students where they were taught using reciprocal teaching. Without this study, the effect size from this category was d=0.65 (K=14, Qw=11.28).

A study from *Miller, G.E., (1985), with effect size, d=1.56*, from the Average group was identified as an outlier and this was the only study within the aggregation where sample size was less than 45. The removal of this study, dropped the effect size to d=0.31 and the Q value was not significant (K=8, Qw=4.93).

Two outliers from the Low ability group were those from *Alfassi., M., (1998)* (d=-0.23) where the study was conducted on the Israeli population in the remedial reading classes, and *Kinnunen, R., and Vauras, M., (1995)* with *low achievers* fourth graders in Finland was detected as having a large effect size of d=1.43. With the removal of these studies, the effect size was d=0.67 and the Q value was not significant (K=8, Qw=5.64).

The results indicated that the Q value from the Low ability and the average group categories were significant and these groups were partitioned into Methods of Assignment (Stringent /Less stringent methods of assignment). The results were presented in the next section.

Table 7

Ability Group category: Mixed Ability Group=1, Low Ability Group=2, Average Group=3

--Heterogeneity--

Class	#Studies	Qw	df	Prob (Chi-square)
Low ability	11	18.73	10	0.04
Average	9	17.45	8	0.03
Mixed ability group	15	14.94	14	0.38

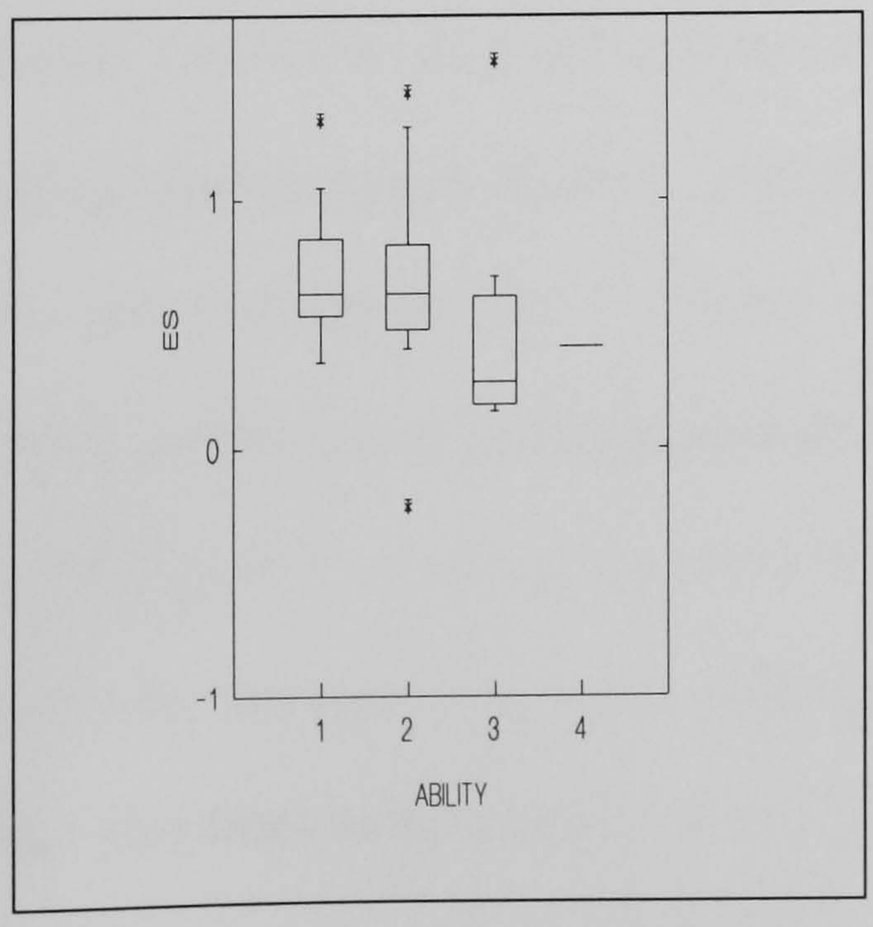
Model	df	Q	Prob(Chi-Square)	Prob(Rand)
Between	2	11.41	0.00	0.07
Within	32	51.12	0.02	
Total	34	62.54	0.00	

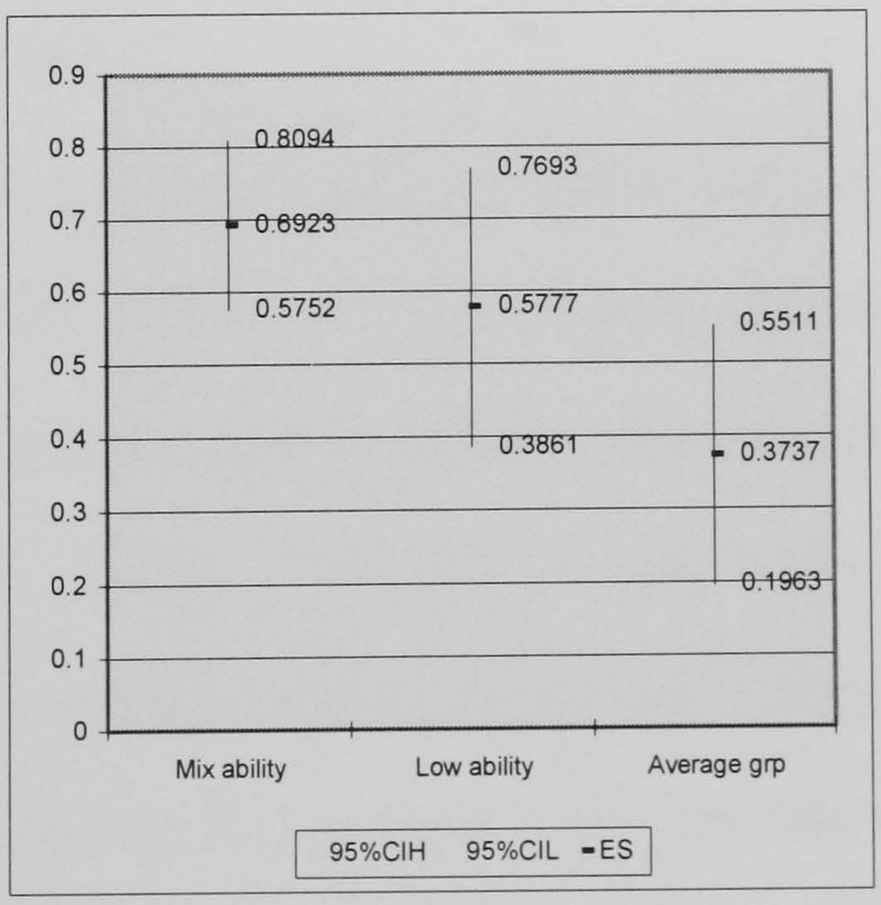
--Mean Effect Sizes--

Class	#Studies	E+	df	95% CI	Bootstrap CI	Bias CI
Low ability	11	0.58	10	0.37 to 0.77	0.33 to 0.81	0.30 to 0.79
Average grp	9	0.37	8	0.20 to 0.55	0.24 to 0.60	0.24 to 0.61
Mixed ability	15	0.69	14	0.58 to 0.81	0.56 to 0.82	0.56 to 0.82

Figure 14: Box plot and 95% CI plot of standardized mean difference, d, for different Ability Groups

Mix Ability Group=1, Low Ability Group=2, Average Group=3, High Ability=4





The within class statistics in the Low ability group and the average group were significant. The Low ability group was subdivided into studies with Stringent and less stringent methods of Assignment. The effect was large on studies with Stringent methods of assignment (d=0.66, K=5, Qw=1.79) than those from Less stringent methods of assignment where the effect was d=0.49, (K=5, Qw=16.03). All the studies within the Average group were Stringent and no further grouping were made from this group.

(iv) Instructional variables: Types of reading materials used, Post-tests measures, Instructors, strategies used

It was hypothesized that the instructional variables such as the type of reading materials used, post-tests measures and the instructors involved in the treatment could have influence the results of the treatment. For instance, the use of metacognitive strategies might have a positive impact on the subjects reading the narrative texts than those using the expository texts, and that the training or treatment conducted by the researchers with the post-tests measures developed by the experimenters would have a positive treatment effect.

Type of reading materials used. The homogeneity statistics associated with this Variable was significant ($Q_B^{(1)} = 6.52$. The effects of the treatment differed significantly on the type of reading materials used during the treatment. The effect on the use of expository reading materials was greater, *d=0.68 (K=24, Qw= 38.02)* compared with the use of narrative reading materials, *d=0.48 (K=12, Qw=18.19).* The effect size from both categories were moderate and significant (95% Confidence Interval).

An outlier was detected from the box plot within the expository text category. The study was from Alfassi, M., (1998), where reciprocal teaching was

used to teach a group of high school students in the remedial reading classes in Israel. Without this study, the effect size increased to d=0.73, and the *Qw* was not significant (K=23, Qw= 24.47).

Table 8

Types of Reading Category: Types of reading materials used: Narrative=1, Expository=2

--Heterogeneity--

Class	*#Studies*	*Qw*	*df*	*Prob (Chi-square)*
Expository	*24*	*38.02*	*23*	*0.03*
Narrative	*12*	*18.20*	*11*	*0.08*

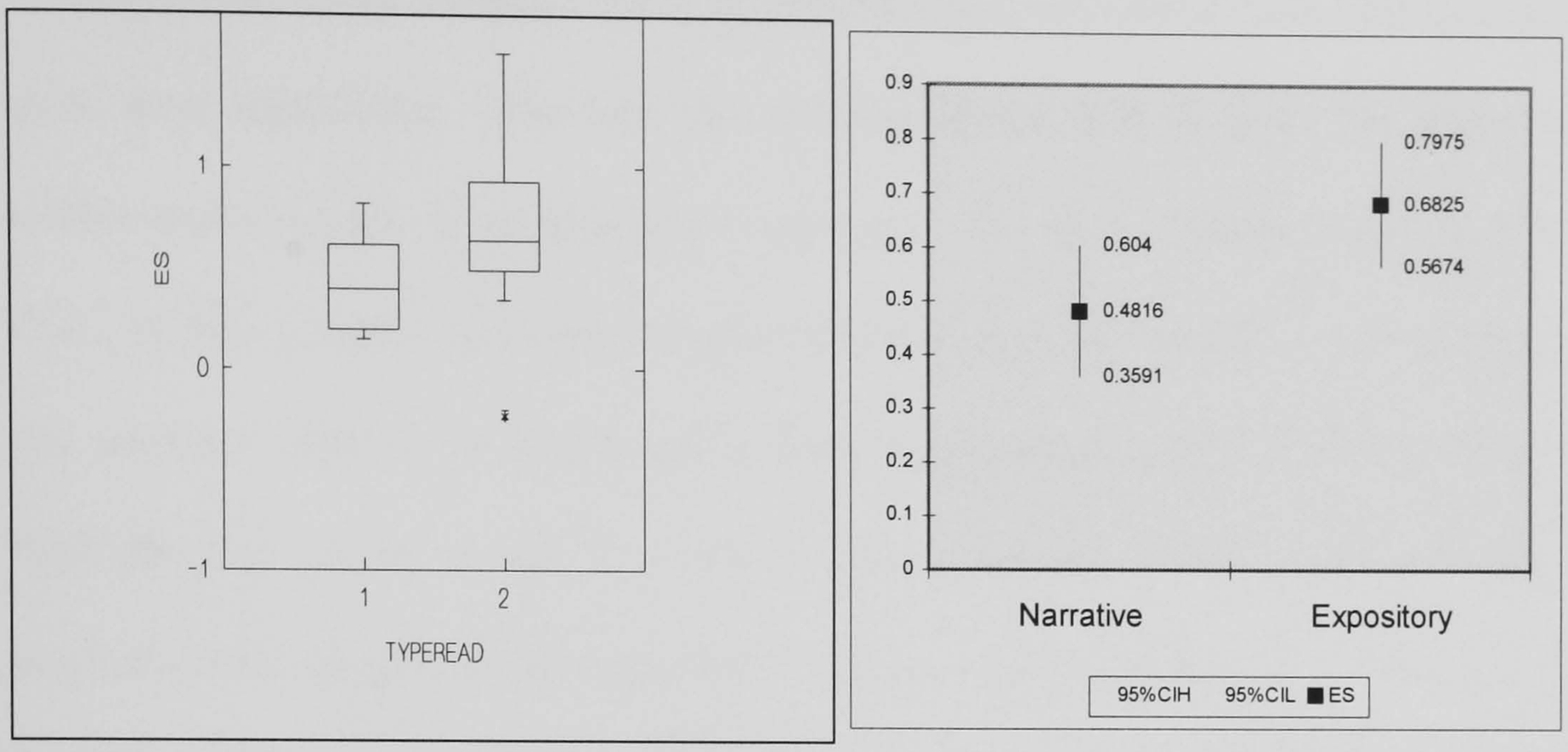
Model	*df*	*Q*	*Prob(Chi-Square)*	*Prob(Rand)*
Between	*1*	*6.52*	*0.01*	*0.08*
Within	*34*	*56.22*	*0.01*	
Total	*35*	*62.74*	*0.003*	

--Mean Effect Sizes--

Class	*#Studies*	*E+*	*df*	*95% CI*	*Bootstrap CI*	*Bias CI*
Expository	*24*	*0.68*	*23*	*0.57 to 0.80*	*0.52 to 0.82*	*0.53 to 0.82*
Narrative	*12*	*0.48*	*11*	*0.36 to 0.60*	*0.27 to 0.64*	*0.28 to 0.66*

Figure 15: Box plot and 95% CI plot of standardized mean difference, d, for Type of reading materials used

Narrative=1, Expository=2



Partitioning Expository reading materials into various strategies used

The within class statistics of expository reading materials was significant (K=24, Qw=38.02), and this variable was subdivided into various strategies used by the researches to teach or train the subjects in comprehending the expository texts. The effects were large with *generative learning /attribution training,* d=1.09 (K=2, Qw=0.67), *Verbalization,* d=1.02 (K=3,Qw=3.25) followed by moderate effects when used with *graphic/visual/imagery*, d=0.74 (K=5, Qw=4.166), *direct instruction*, d=0.55, (K=8, Qw=3.17) and *reciprocal teaching*, d=0.58, (K=6, Qw=17.18) were used in comprehending the expository texts.

Type of Post-test measures. The type of Post-test measures was not significantly associated with the variation in the observed effect size measures, QB (1) = 0.95. The mean effect sizes for experimenter developed tests and standardized tests were moderate, d=0.60, (K=28, Qw= 0.95) for experimenter developed tests and d=0.51,

(K=8, Qw=15.83) for standardized tests. The difference was not statistically significant.

The within class statistics (Qw) of experimenter developed tests and standardized tests were significant. The box plot detected three outliers from the three studies within experimenter developed tests category. The three studies were from Miller, G.E., (1985) a study on *General self-instruction plus self-verbalization strategy* with the *younger children* in fourth grade from the average group, Alfassi., M., (1998), with the *low ability group* in *a non-English speaking culture* in Israel where the students were taught using reciprocal teaching and Kinnunen, R., and Vauras, M., (1995) with the *low achievers* fourth graders in Finland taught using direct instruction. Without these studies, the effect size was still moderate d=0.60 (K=25, Qw=25.51).

Table 9

Post-test measures category: Standardized=1, Experimenter developed=2.

--Heterogeneity--

Class	#Studies	Qw	df	Prob (Chi-square)
Experimenter developed	28	0.95	27	0.01
Standardized	8	15.83	7	0.03

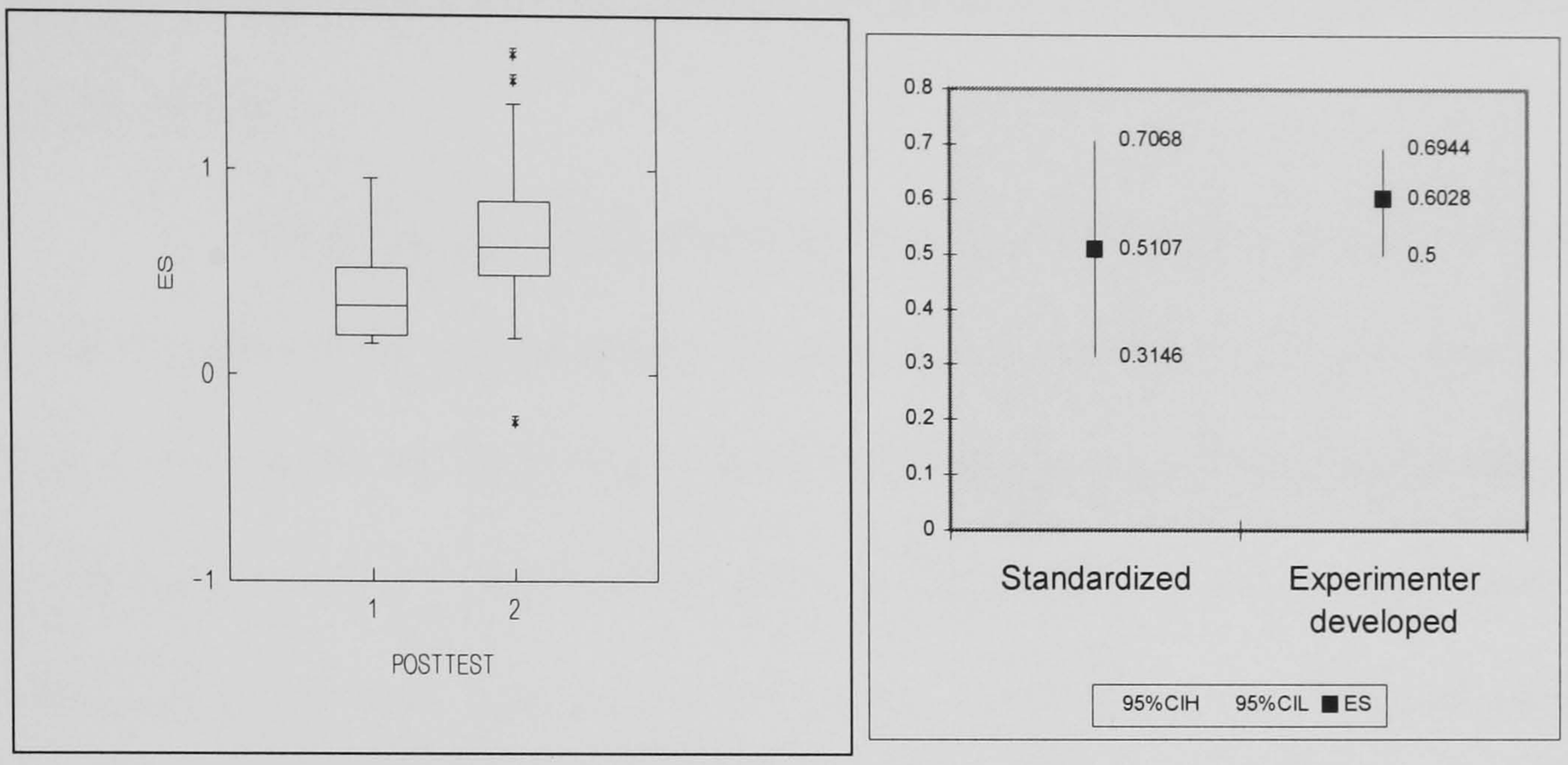
Model	df	Q	Prob(Chi-Square)	Prob(Rand)
Between	1	0.95	0.33	0.51
Within	34	61.79	0.00	
Total	35	62.74	0.00	

--Mean Effect Sizes--

Class	# Studies	E+	df	95% CI	Bootstrap CI	Bias CI
Experimenter developed	28	0.60	27	0.51 to 0.69	0.48 to 0.73	0.48 to 0.72
Standardized	8	0.51	7	0.31 to 0.71	0.22 to 0.76	0.23 to 0.77

Figure 16: Box plot and 95% CI plot of standardized mean difference, d, for Type of post-test used

Standardized post test=1, Experimenter developed test=2



The large Qw value within both categories of Post-test measures suggest the need for further grouping to find out the related moderators for the variation of effect sizes associated with these variables.

Partitioning experimenter developed tests into ability group.

Within groups homogeneity statistics for each category *(Q_W)* of the Post-test measures were significant. Each of the categories was divided into studies with different type of ability group. The mean effect size was highest, *d=0.65 (K=14, Qw=11.28)* when the *mix ability group* was tested using the experimenter developed tests, followed by the moderate effects on *Low ability group*, *d=0.60 (K=8, Qw=18.18)*, the *Average group d=0.48, (K=5, Qw=14.04)*, and the *High ability group* d=0.40, (K=1, Qw=0.00).

Partitioning standardized post-tests into ability group

There were only two types of students selected within the standardized

Post-tests. The effect were highest with the *mix ability group, d=0.95, (K=1, Qw=0.00),* followed by the *Low ability group* where the effects were moderate, *d=0.51, (K=3, Qw=0.36)* and the *Average group* with the smallest effect of *d=0.19, (K=4, Qw=0.12).*

Generally, the effect was large when *standardized post-tests (d=0.95, K=1, Qw=0.00)* or the *experimenter developed tests (d=0.65, (K=14, Qw=11.28)* were used on the Mix ability group. However, interpretation of the results should be made cautiously with the standardized post-test (Mix ability group) where there was only one study within this group. This was a study by King C.M., (1999) where each class with approximately 25 students from heterogeneous group with *special needs, learning disabled and regular education students were taught using reciprocal teaching.*

The instructors. It was hypothesized that the treatment effect would be greater When the researchers were involved in the training of the strategies, than those conducted by the classroom teachers or the research assistance. This analysis revealed that the effects were large when the research assistants conducted the training compared to the researchers where the treatment effect was moderate.

The between study index, *QB (3) = 3.57* indicated that this variable was Not significant. The mean effect size was highest, *d=1.04, (K=2, Qw=4.99)* when the research assistants conducted the training, followed by the researchers, *d=0.59 (K=23, Qw=25.04),* Classroom teachers, *d=0.56, (K=9, Qw=28.93)* and others, d= 0.52, (K=2, Qw= 0.21), but the difference was not statistically significance.

With reference to the box plot, an outlier with a negative value (d=-0.23) was detected within the *classroom teachers category* and it was a study by Alfassi, M., (1998) with a group of high school students in the remedial reading

classes from a non-English speaking culture in Israel. With the removal of this study, the effect size increased to *d=0.59* and the Q value dropped to *Qw=18.87 (K=8).*

Within the *researchers category*, a study by Kinnunen, R., and Vauras, M., (1995) with *low achievers* fourth graders in Finland was detected as having a large effect size of d=1.43. Without this study, the effect size dropped to *d=0.58, Qw=23.04 (K=22).*

Further grouping were made within the *classroom teachers category* and the *research assistants* category due to the significant Qw value within each group.

Partitioning 'classroom teachers' category into sample size

The studies within the research assistant's category were examined and both studies within this group have a sample size of less than 45 (32-44), d=1.04 (K=2, Qw=4.99). There was only one study with a sample size of 36 (d=0.97, K=1, Qw=0.00) within the 'classroom teachers' category, the mean effect size for studies between the size of 46-100 and more than 100 was d=0.20, (K=2, Qw=5.77) and d=0.61, (K=5, Qw=5.76). Given that, there was only one study with a sample size of *less than 45,* it is inconclusive as to whether the variation between the two groups of studies was due to the sample size.

Partitioning 'Research Assistants' category

There were only two studies within this category. Both studies were conducted on less than 45 students in the average and high ability group. The difference might be due to the size of the samples used during the treatment. The effect was also within a large range (d=0.97) when the classroom teachers conducted

the treatment. However, the contrast was only based on two studies from this category (research assistants) and only one study where the classroom teacher carried out the instruction.

Table 10

'Instructors' category: Classroom teachers=1, researchers=2, research assistants=3, others=4

--Heterogeneity--

Class	#Studies	Qw	df	Prob (Chi-square)
Researchers	23	25.04	22	0.30
Research assistants	2	4.99	1	0.03
Classroom teachers	9	28.93	8	0.00
Others	2	0.21	1	0.65

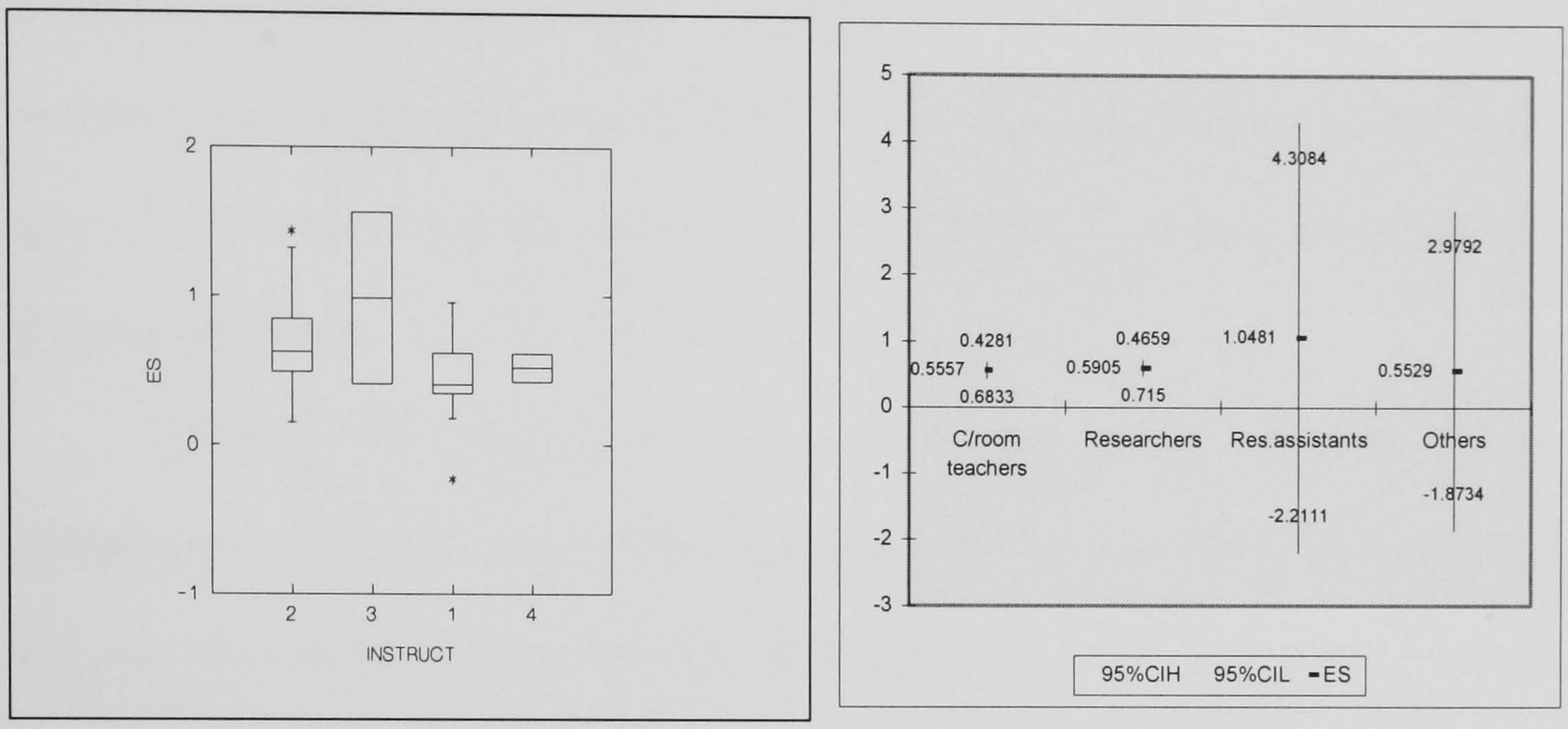
Model	df	Q	Prob(Chi-Square)	Prob(Rand)
Between	3	3.57	0.31	0.67
Within	32	59.18	0.00	
Total	35	62.74	0.00	

--Mean Effect Sizes--

Class	#Studies	E+	df	95% CI	Bootstrap CI	Bias CI
Researchers	23	0.59	22	0.47 to 0.72	0.47 to 0.74	0.47 to 0.74
Research assistants	2	1.05	1	-2.21 to 4.31	0.41 to 1.56	0.41 to 1.56
Classroom teachers	9	0.56	8	0.43 to 0.68	0.30 to 0.74	0.3155 to 0.74
Others	2	0.55	1	-1.87 to 2.98	0.43 to 0.61	0.43 to 0.61

Figure 17: Box plot and 95% CI plot of standardized mean difference, d, for different instructors during the training

Instructors: Classroom teachers=1, researchers=2, research assistants=3, others=4



Strategies used. Various strategies or instructional procedures were employed to improve the students reading comprehension. The popular ones being direct instruction and reciprocal teaching. A study emphasizing cooperative learning by the students to bring meaning to the ideas in the text was also classified under the category of reciprocal teaching. Another group of studies were those from generative model of teaching and learning or studies that taken into account the student's motivation in improving the reading comprehension. The fourth group consists of studies that used graphic/visual/imagery to facilitate or enhance student's performance. The fifth groups are those studies that employed self-instruction and verbalization and finally the last group consists of studies that used a single strategy such as questioning.

The homogeneity analysis revealed that this variable was significantly associated with the variation in the observed effect sizes, *QB (5) = 20.55*. The

effects differed significantly among the different types of strategies used to improve the performance on reading comprehension. Studies using *self-instruction and verbalization strategy* reported favorably high significant effects *(d=1.02, K=3, Qw=3.25)* compared to the modest effect by studies using *generative learning in combination with motivation (d=0.76, K=5, Qw= 4.01), use of graphic/visual/imagery (d=0.74, K=5, Qw= 4.17), reciprocal teaching (d=0.67, K=7, Qw=19.77), direct instruction (d=0.44, K=13, Qw=8.53) and smallest effects when questioning strategy were used (d=0.35, K=3, Qw= 2.47*).

The box plot detected an outlier within each of the categories in direct instruction and reciprocal teaching. The large effect size within direct instruction category was a study by Kinnunen, R., and Vauras, M., (1995) with the low achievers fourth graders in Finland. The negative effect size from reciprocal teaching was a study by Alfassi, M., (1998) with the high school students from remedial reading classes in Israel.

Table 11

Strategy use: Direct instruction=1, reciprocal teaching=2, generative learning and use of motivation=3, graphic/visual/imagery=4, self-instruction and verbalization=5, questioning=6

--Heterogeneity--				
Class	#Studies	Qw	df	Prob (Chi-square)
Graphic/visual/imagery	5	4.17	4	0.38
Verbalization	3	3.24	2	0.20
Direct instruction	13	8.53	12	0.74
Generative learning & use of motivation	5	4.00	4	0.41
Questioning	3	2.47	2	0.29
Reciprocal teaching	7	19.77	6	0.00

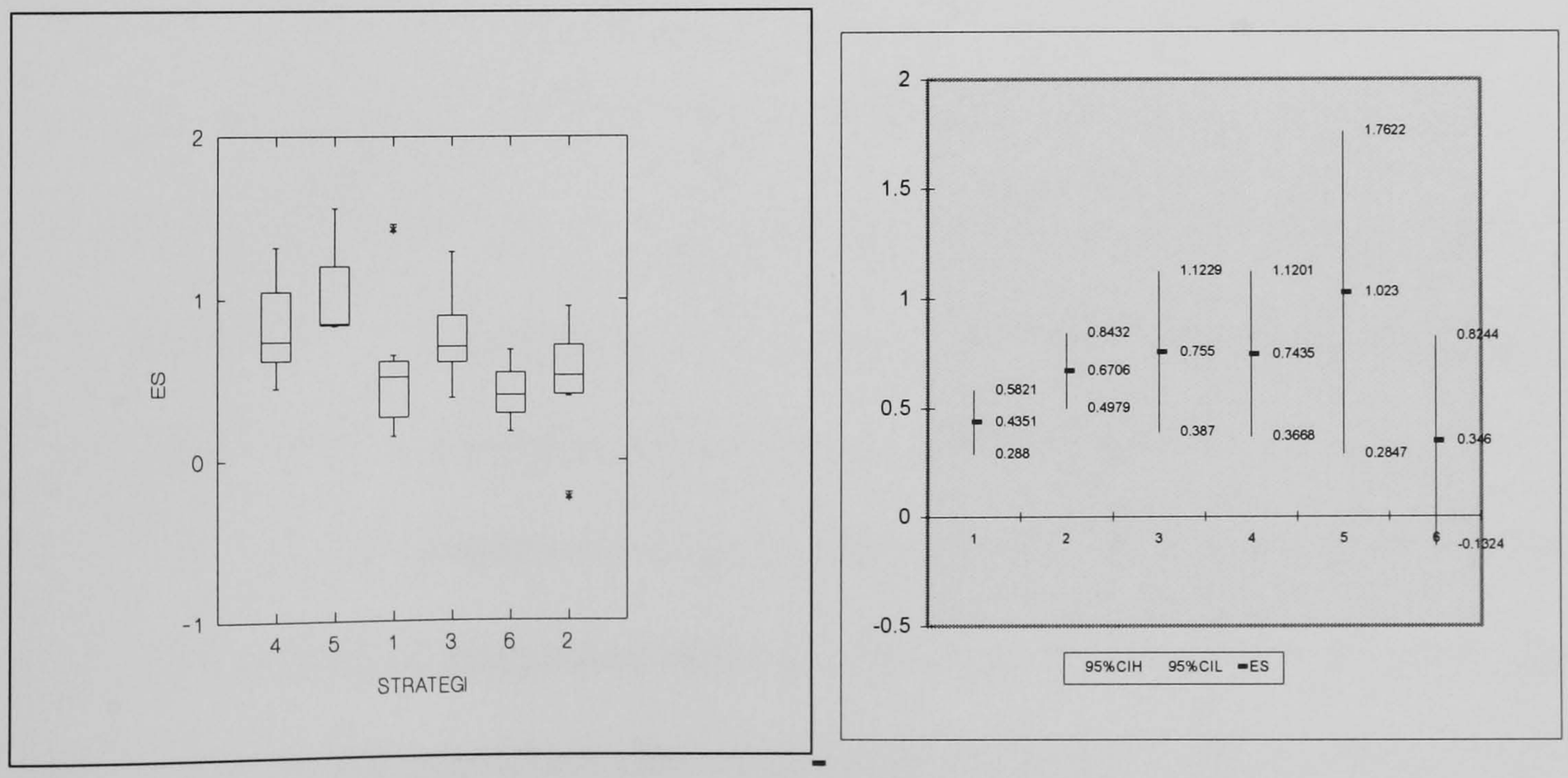
Model	df	Q	Prob(Chi-Square)	Prob(Rand)
Between	5	20.55	0.00	0.08
Within	30	42.20	0.07	
Total	35	62.74	0.00	

--Mean Effect Sizes--

Class	#Studies	E+	df	95% CI	Bootstrap CI	Bias CI
Graphic/visual/imagery	5	0.74	4	0.37 to 1.12	0.47 to 1.29	0.47 to 1.29
Verbalization	3	1.02	2	0.28 to 1.76	0.84 to 1.56	0.84 to 1.26
Direct instruction	13	0.43	12	0.29 to 0.58	0.30 to 0.53	0.30 to 0.53
Generative learning / motivation	5	0.76	4	0.39 to 1.12	0.58 to 1.03	0.58 to 1.03
Questioning	3	0.35	2	- 0.13 to 0.82	0.18 to 0.69	0.18 to 0.52
Reciprocal teaching	7	0.67	6	0.50 to 0.84	0.28 to 0.83	0.29 to 0.84

Figure 18: Box plot and 95% CI plot of standardized mean difference, d, for different strategies used during Intervention

Strategy use: Direct instruction=1, reciprocal teaching=2, generative learning and use of motivation=3, graphic/visual/imagery=4, self-instruction and verbalization=5, questioning=6



Partitioning reciprocal teaching category into ability group

The Qw value within the *reciprocal teaching category* was significant and was sub grouped into Mix ability group, *d=0.87, (K=2, Qw=0.53)* and Low ability group, *d=0.38 (K= 5, Qw=7.51).*

(v) Design Features: Methods of Assignment to group, length of treatment in days, number of training sessions and Sample size.

Methods of Assignment: Studies that used matching or random assignment in the pre-experimental conditions were coded as 'stringent' and those that did not randomly assign the samples were coded as 'less stringent'. It was hypothesized that studies with 'stringent methods of assignment' to group would produce higher effect sizes than the 'less stringent methods of assignment'.

This variable was not significantly associated with the variation in effect sizes, QB *(.1) = 2.76.* In this analysis, the effect size was *d=0.70, (K=10, Qw=9.62) for the* 'stringent' methods of assignment, and *d= 0.55 (K=25, Qw= 50.26) for the less stringent method of assignment to group.* One study provide no information on this variable and was coded as 0.99, the effect size was large d=1.05, (Qw= 0.00). The effects did not differ significantly among the two groups. The difference might be due to the influence of outliers detected within each category.

The box plot identified a study by Miller, G.E., (1985) as an outlier within the 'stringent' method of assignment category. The large treatment effect from this study might be due to the population characteristics or the strategy used during the training. In this study, the fourth grade students were trained individually with *General self-*

instruction plus verbalization strategy within a week. Without this study, the effect size dropped to d=0.65, (K=9, Qw=3.06).

Next, three outliers were identified within the 'Less stringent' category. The three studies were from Alfassi, M., (1998), King, C.M., (1999) and Kinnunen, R., and Vauras, M., (1995). Without these studies, the effect size dropped to d=0.52, (K=22, Qw=30.96). The Q value within this group was significant and further grouping were made within this category into ability group.

Table 12

Methods of Assignment category: 'Stringent'=1, Less Stringent=2

Excluded Groups from "Q": 0.9900

--Heterogeneity--

Class	*#Studies*	*Qw*	*df*	*Prob (Chi-square)*
Stringent	*10*	*9.62*	*9*	*0.38*
Less stringent	*25*	*50.26*	*24*	*0.00*

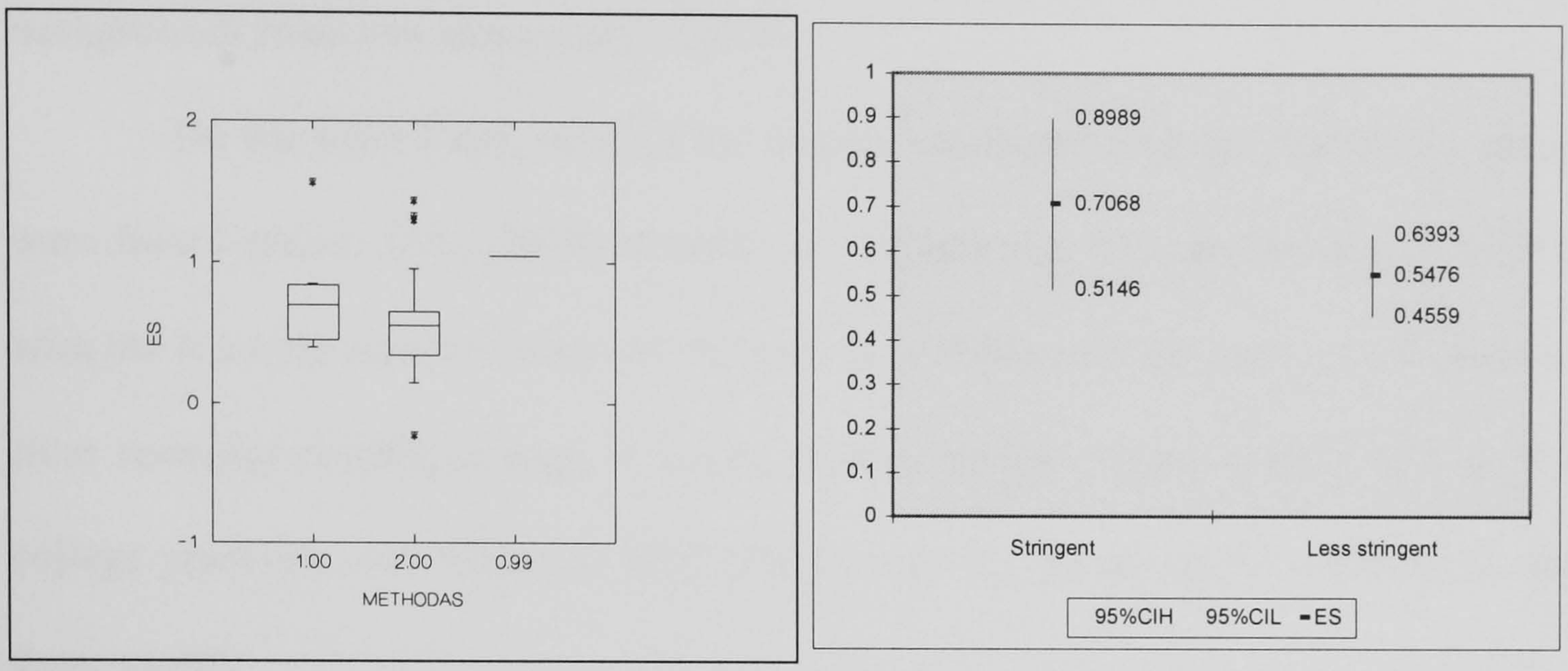
Model	*df*	*Q*	*Prob(Chi-Square)*	*Prob(Rand)*
Between	*1*	*2.76*	*0.10*	*0.28*
Within	*33*	*59.88*	*0.00*	
Total	*34*	*62.64*	*0.00*	

--Mean Effect Sizes--

Class	*#Studies*	*E+*	*df*	*95% CI*	*Bootstrap CI*	*Bias CI*
Stringent	*10*	*0.71*	*9*	*0.51 to 0.90*	*0.57 to 0.87*	*0.57 to 0.88*
Less stringent	*25*	*0.55*	*24*	*0.46 to 0.64*	*0.39 to 0.68*	*0.39 to 0.68*

Figure 19: Box plot and 95% CI plot of standardized mean difference, d, for Method of Assignment to Groups

'Stringent'=1, Less Stringent=2



Partitioning the Less stringent methods into 'Ability group'

The *Qw* for the less stringent methods was not homogeneous and was sub grouped into students 'ability group'. The treatment effect of studies within the Less stringent methods of assignment conducted with the Mix ability group had a greater impact of d=0.69, (K=9, Qw=13.02), compared with those studies with the Low ability group where the effect size was d=0.55, K=7, Qw=17.05) , d=0.28, K=7, Qw=3.18) for the Average group and d=0.40(K=1, Qw=0.00) for the high ability group. One study did not provide information on this variable, d=0.62, K=1, Qw=0.00).

The Mix ability group consist of studies from Boyle, O.F., (1986) with the undergraduates from University of Berkeley who had volunteered to participate in the 'Learning from Text' course, Cordero-Ponce, W.L., (2000)[1,2] the French undergraduates enrolled for an intermediate French course at a public university, and

King, C.M., (1999) with the heterogeneous group of participants with learning disabled, special needs and regular education students, Bossert, T.S, and Schwantes, F.M.(1996) with studies from various age group (9-11 yrs old), and Rinehart,S.D Stahl, S.A., and Erickson,L.G.(1986) with students from various socio-economic backgrounds from two elementary schools.

On the other hand, some of the studies conducted with the low ability group were from Lederer, J.M., (2000) Miranda, A., Villaescusa, M.I, and Abarca, V. (1997) with the *learning disabled* students, Alfassi, M., (1998) with the *high school students from remedial reading clas*ses in Israel, Hodge, Evelyn Adams (1991) with at *risk* college students, and Wittrock, M.C (1991) with the young adults (soldiers in the army camp).

The studies within the Average group consist of a study by Leon, J.A and Carretero, M., (1995) from a population in Madrid, Spain, whereas Edynn Yuri Sato, (1996) and Paris, S.G., Cross, D.R., and Cross (1984) with the younger students ranging from grade 3-5.

Duration of the treatment: The duration of an intervention is a significant factor in the practical significance of an intervention. It was hypothesized that the duration of the treatment would have a significant effect on the results of the treatment. However, in this analysis, the effects were moderate for any duration of treatment either for elapsed time in days or the number of training sessions

The between study index for this variable was QB (3) =5.79. This variable was not significantly associated with the variation in effect sizes. The mean effect sizes were equally moderate for either treatment less than 15 days (d=0.50, K=13, Qw= 16.23), 15-25 days (d=0.47, K=4, Qw=13.97) or more than 25 days (d=0.61, K=10, Qw=21.25).

Nine studies did not provide information on the length of treatment in days and the effect size was d=0.78, (K=9, Qw=5.51). Although the effect was highest when the treatment was conducted more than 25 days, the difference was not statistically significant.

However, when further analysis of studies conducted within the elapsed time of 15 – 25 days were broken down into the number of sessions , it appeared that the effect size was large, d=1.32 when only 1-5 number of sessions were carried out as compared to more than 5 sessions were carried out within the number of days given. It indicates that the treatment would be more effective if the training sessions were distributed within the elasped time of the experiment.

As shown in the box plot, an outlier was detected within the first category (Less 15 days). This study was from Miller, G.E., (1985) where the students received three 45 minutes individual training sessions within a week. Without this study, the effect size dropped to d=0.45 (K=12, Qw=6.27).

Table 13

Length of treatment (In days) category: <15=1, 15-25=2, >25=3, 0.99=No information

--Heterogeneity--

Class	#Studies	Qw	df	Prob (Chi-square)
<15days	13	16.23	12	0.18
No information	9	5.51	8	0.70
15 -25 days	4	13.97	3	0.00
≥25 days	10	21.25	9	0.01

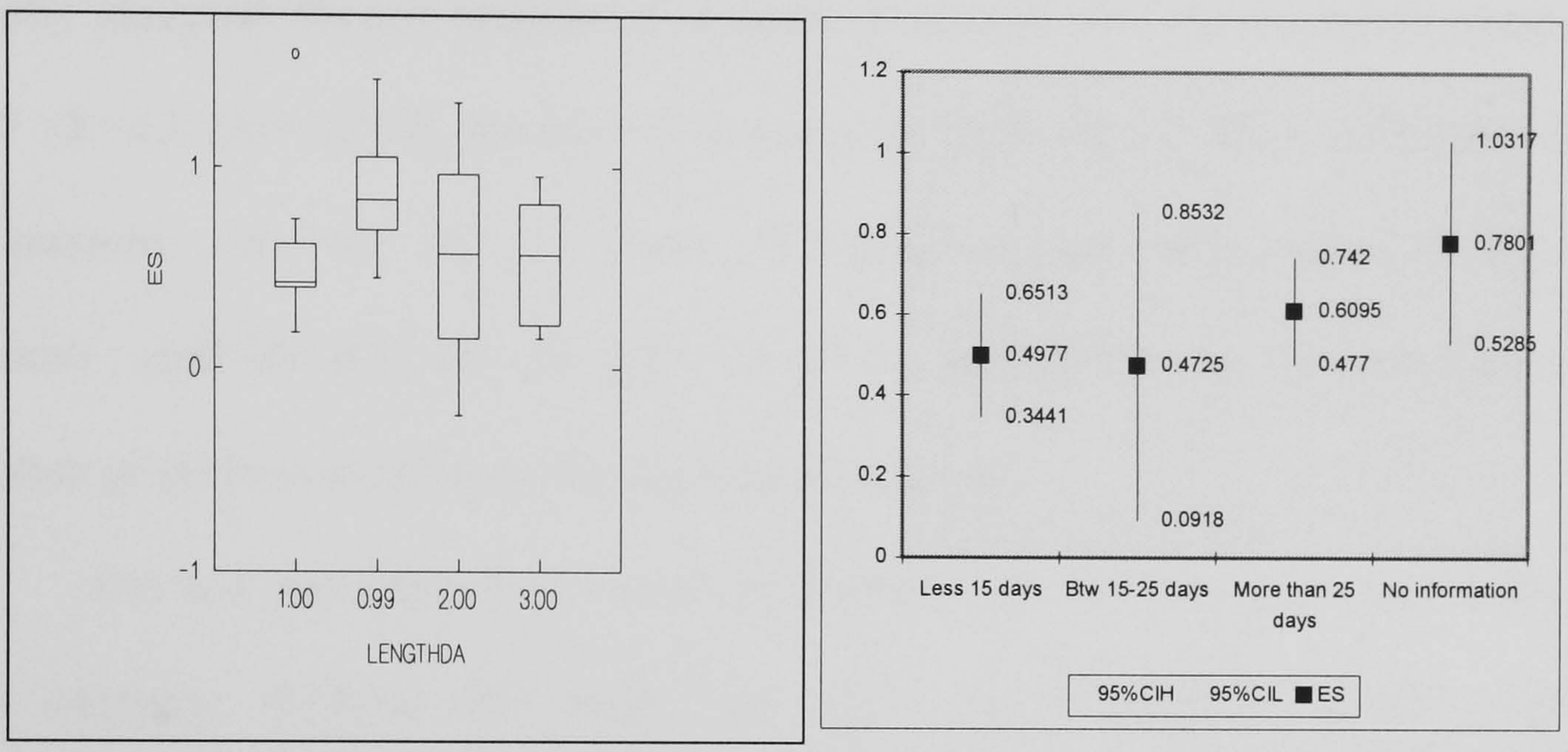
Model	df	Q	Prob(Chi-Square)	Prob(Rand)
Between	3	5.79	0.12	0.521
Within	32	56.95	0.00	
Total	35	62.7445	0.00	

--Mean Effect Sizes--

Class	#Studies	E+	df	95% CI	Bootstrap CI	Bias CI
<15 days	13	0.50	12	0.34 to 0.65	0.36 to 0.66	0.35 to 0.66
No information	9	0.78	8	0.53 to 1.03	0.63 to 0.99	0.62 to 0.97
15-25 days	4	0.47	3	0.09 to 0.85	0.00 to 0.88	-0.02 to 0.86
>25 days	10	0.61	9	0.48 to 0.74	0.38 to 0.76	0.41 to 0.79

Figure 20: Box plot and 95% CI plot of standardized mean difference, d, for Length of treatment (In days)

Length of treatment (In days) <15=1, 15-25=2, >25=3, 0.99=No information



Partitioning studies between 15-25 days into number of sessions

As for the studies conducted between 15-25 days, the treatment effect was large (d=1.32, K=1, Qw=0.00) when 1-5 sessions was carried out to train the students and was d=0.61, (K=1, Qw=0.00) when 6 – 10 sessions were carried out within the number of days given. No information was given on the number of sessions carried out on another two studies within this category. Since there was only one study within each of the category of 1-5 sessions and 6-10 sessions, interpretation of the results should be made cautiously.

Partitioning studies with treatment more than 25 days into number of sessions

Nine out of ten studies within this group conducted more than 10 training sessions for the treatment group, the effect size was d=0.60, (K=9, Qw=21.25). One

study did not provide information on the number of training sessions carried out during the treatment.

Number of training sessions. This variable was not significantly associated with the variation in the observed effect sizes. QB (3) = 0.67. The mean effect sizes were equally moderate for any number of sessions conducted with the treatment group, *d= 0.60 (K=13, Qw=22.92), for the 1-5 sessions, d= 0.58 (K= 2, Qw= 0.03) for the 6-10 sessions, , d=0.60, (K= 11 Qw= 21.89) for studies conducted more than 10 sessions ,and d= 0.51 (K=10, Qw= 17.23)* for studies with no information on the number of session conducted with the treatment group.

The box plot identified a study by Miller, G.E., (1985), an outlier within the first category. Without this study, the effect size dropped to d=0.55, (K=12, Qw=14.07. This study was conducted with the average group in the fourth grade. The extreme value might influence the results of the grouping in the next section.

Partitioning studies conducted for 1-5 sessions into ability group

The mean effect sizes were d=0.71, (K=8, Qw=5.64) when conducted with the Mix ability group, d=0.43, (K=3, Qw=13.06), with the Average group, d=0.74, (K=1, Qw=0.000) with the Low ability group and d=0.41, (K=1, Qw=0.00) with the High ability group.

The effect size of the Average group conducted within this session dropped from d=0.43 (K=3, Qw=13.06) to d=0.29, (K=2, Qw=0.91) when an outlier was removed from this group.

Partitioning studies conducted for > 10 session into ability group

The mean effect sizes were d=0.66, (K=2, Qw=3.46) with the Mix ability group, d=0.59, (K=4, Qw=1.44), with the Low ability group, and d=0.195, (K=4, Qw=0.12) with the Average group,

Table 14

Number of Sessions category: Sessions: 1-5=1, 6-10=2,>10=3, 0.99=No information)

--Heterogeneity--

Class	*#Studies*	*Qw*	*df*	*Prob (Chi-square)*
1-5 sessions	*13*	*22.92*	*12*	*0.03*
6-10 sessions	*2*	*0.03*	*1*	*0.86*
No information	*10*	*17.23*	*9*	*0.05*
> 10 sessions	*11*	*21.89*	*10*	*0.016*

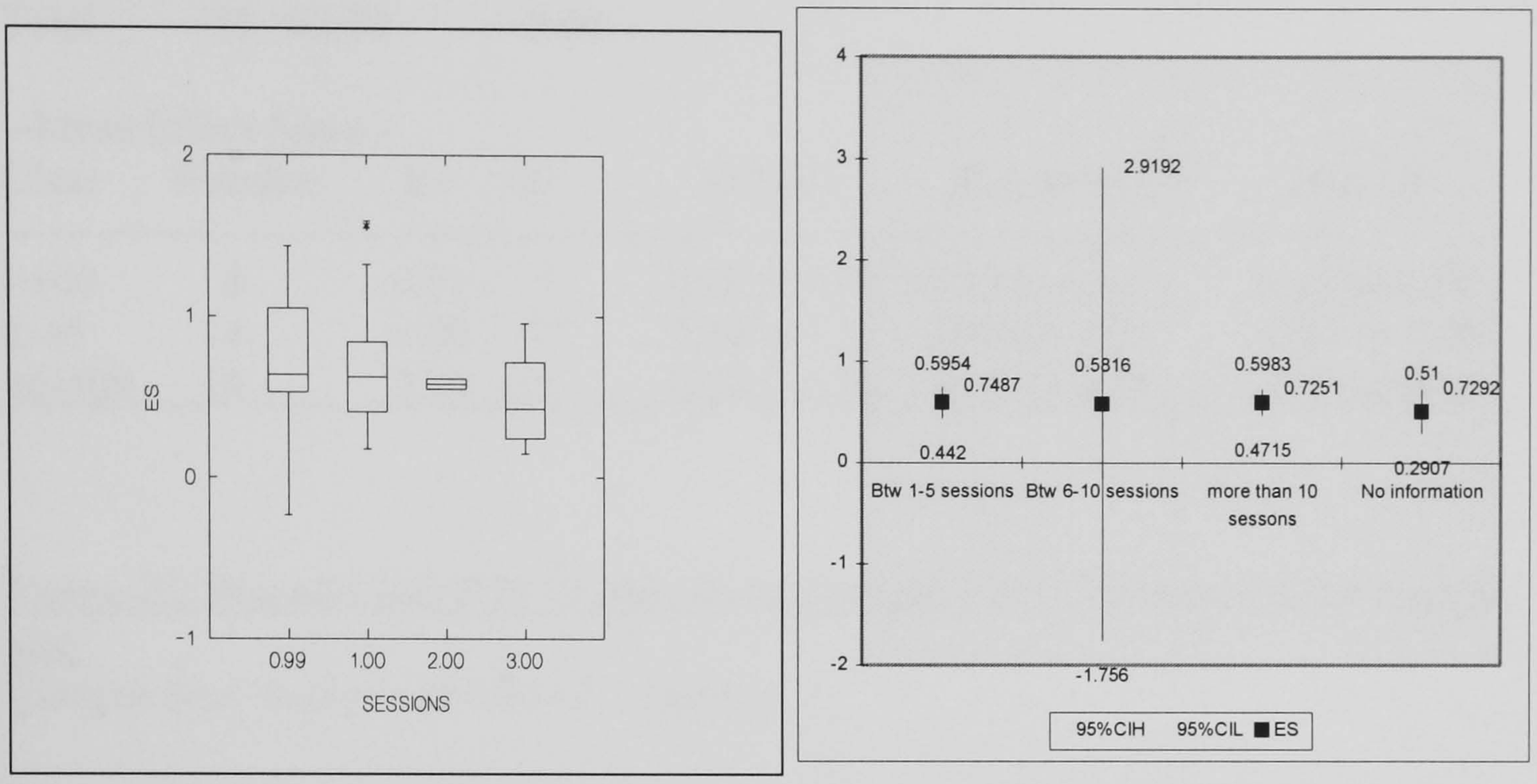
Model	*df*	*Q*	*Prob(Chi-Square)*	*Prob(Rand)*
Between	*3*	*0.67*	*0.88*	*0.97*
Within	*32*	*62.07*	*0.00*	
Total	*35*	*62.74*	*0.00*	

--Mean Effect Sizes--

Class	*#Studies*	*E+*	*df*	*95% CI*	*Bootstrap CI*	*Bias CI*
1-5 sessions	*13*	*0.60*	*12*	*0.44 to 0.75*	*0.42 to 0.82*	*0.41 to 0.81*
6-10 sessions	*2*	*0.58*	*1*	*-1.76 to 2.92*	*0.55 to 0.61*	*0.55 to 0.61*
No information	*10*	*0.51*	*9*	*0.29 to 0.73*	*0.21 to 0.83*	*0.17 to 0.79*
> 10 sessions	*11*	*0.5983*	*10*	*0.47 to 0.73*	*0.38 to 0.75*	*0.38 to 0.75*

Figure 21: Box plot and 95% CI plot of standardized mean difference, d, for Number of training sessions

Number of training sessions; 1-5=1, 6-10=2, >10=3, 0.99=No information



Sample Size. The homogeneity analysis revealed that sample size was significantly associated with the variation in effect sizes, *QB (2) =9.60*. The treatment effects differed significantly depending on the number of treatment group or sample size. The mean effect sizes was large for sample size of *1-45, d= 0.80, (K= 14, Qw= 16.22),* followed by moderate effect from Sample size *> 100, d= 0.61, K= 8, Qw= 19.24)*, and within the range of *46-100, d=0.43, (K=14, Qw=17.69). Further grouping were made within the category with large Qw value to find out the effects of other moderator variables.*

Table 15

Sample size category: 1-45=1, 46-100=2, >100=3

--Heterogeneity--				
Class	#Studies	Qw	df	Prob (Chi-square)
>100	8	19.24	7	0.01
1-45	14	16.22	13	0.24
46-100	14	17.69	13	0.17

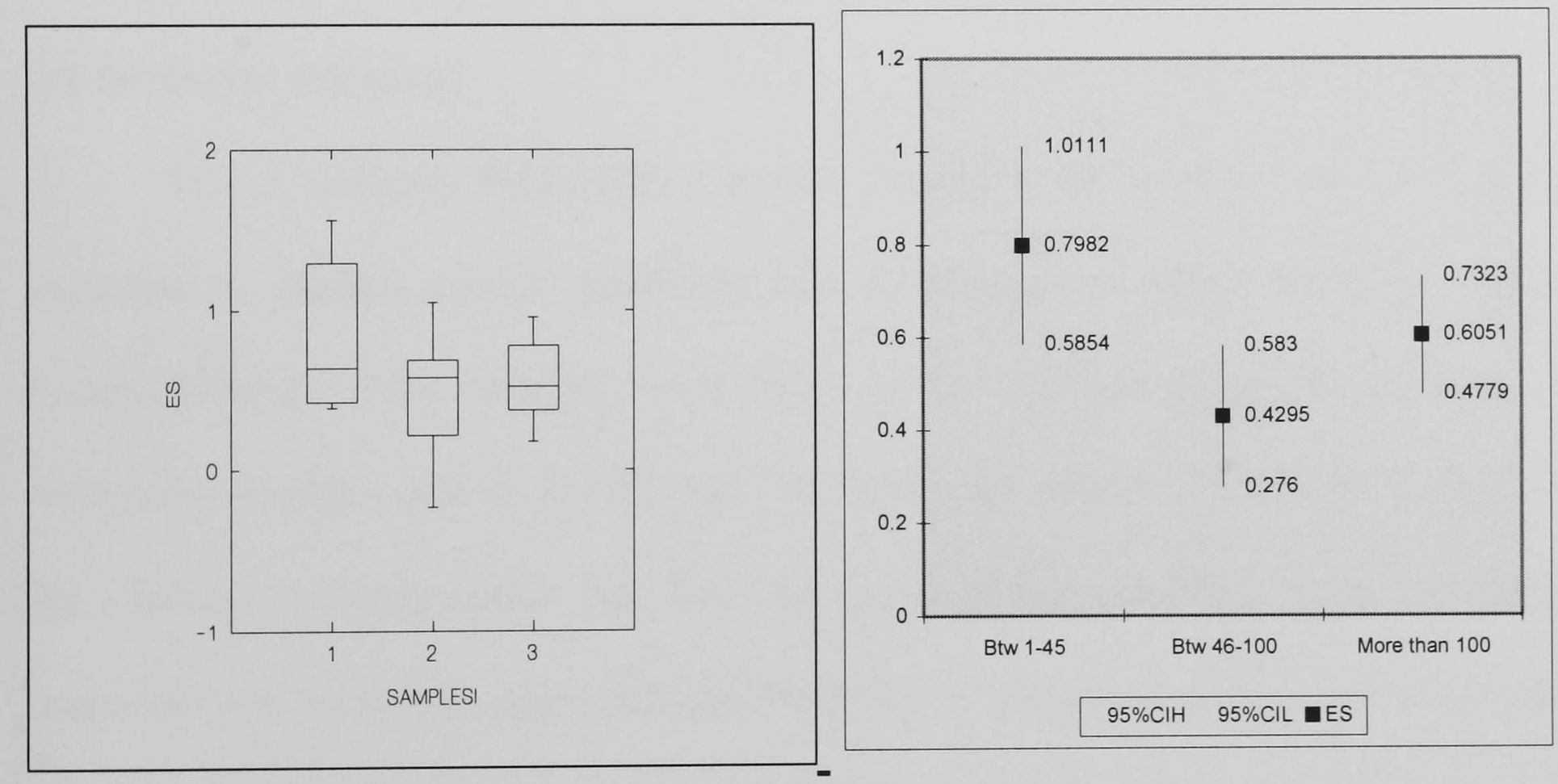
Model	df	Q	Prob(Chi-Square)	Prob(Rand)
Between	2	9.60	0.01	0.11
Within	33	53.14	0.01	
Total	35	62.74	0.00	

--Mean Effect Sizes--

Class	#Studies	E+	df	95% CI	Bootstrap CI	Bias CI
>100	8	0.61	7	0.48 to 0.73	0.43 to 0.76	0.45 to 0.78
1-45	14	0.80	13	0.59 to 1.01	0.60 to 1.03	0.61 to 1.05
46-100	14	0.43	13	0.28 to 0.58	0.25 to 0.59	0.25 to 0.58

Figure 22: Box plot and 95% CI plot of standardized mean difference, d, for Sample size

(*Sample size, 1-45=1, 46-100=2, >100=3)*



Partitioning Sample size >100, into Ability group

The *Qw* value for Sample size *>100* was significant and was partitioned into ability group. The mean effect size was greater when the study was conducted with the *Mix ability group (d=0.69, K=4, Qw=8.81)* compared to the moderate effect on the *Low ability group (d=0.63, K=2, Qw=0.66). The effect was within a small range for* studies in the *Average group (d=0.29, K=2, Qw=0.91).*

(vi) Summary

This chapter reported on the methods and the outcome of the meta-analysis. The overall effect size estimate in this study was *d=0.55 (95% CI; 0.48 to 0.63) and the Q value was; 93.72, df=43, prob (chi-square); 0.00)*. The three dependent variables were reading comprehension, vocabulary comprehension and essays/written assignment as outcome measures to measure the treatment effect of metacognitive strategies. The mean effect size for reading comprehension, vocabulary and written assignment were *d=0.58, d=-0.06, and d= 0.91.* The effect size estimates for the outcome on vocabulary comprehension and written assignment were homogeneous and no further analyses were conducted. The heterogeneity of effect size estimates for reading comprehension warrants additional analysis to detect the potential causes for the excess variation.

In this analysis, *Fixed effects model: Analog to the analysis of variance* was executed to explain excess variability in a distribution of effect sizes for reading comprehension. Five variables were found to be significantly associated with the variability in effect size at $p<.05$; these includes two (Grade and ability level) from the *subjects' characteristics*, two from the *instructional variables (Type of reading materials and strategies used)* and one (Sample size) from the *design characteristics.* Those studies were stratified on key methodological features so that comparison of interest were always made between studies 'matched' on key methodology. This is to ensure that if valid conclusions were to be drawn from the meta-analysis, care must be taken to ensure that comparisons were not contaminated by confounding variables. Further discussion of the results and its implications will be presented in the next chapter.

CHAPTER FOUR

Discussion and Conclusions from the Meta-analysis

4.0 Introduction

This chapter will summarize the findings and discuss the implications of the meta-analysis executed in the previous chapter. The first section will present a brief summary of results from the data analyses and restate the research questions posed in chapter three. In the second section, the results will be discussed in relation to the stated research questions.

4.1 Summary of results

A meta-analysis was conducted to provide an overall picture of the research on the effect of teaching metacognitive strategies on three dependent variables; reading comprehension, vocabulary comprehension and written assignment. The overall effect size estimate in this study was *d=0.55.* A breakdown analysis of the studies outcome was *d=0.58, K=36, Q=62.74* for reading comprehension, *d=-0.06 ,K=4, Q; 4.05)* for vocabulary test, and *d= 0.91,K=4, Q;* 2.52,*) for written assignment.*

In this meta-analysis, shifting units of analysis (Cooper, 1989) was used. In the first stage of data exploration, multiple effect sizes from a single study were first coded as if it was independent. Eighty-two effect sizes were generated from twenty-seven studies and the effect size estimates were computed to test whether the assumption of homogeneity of variance is met or whether they appear heterogeneous. The observed value of the Homogeneity statistics is *Q=377.47 (Mean Effect Size=*

0.50, df=81, 95% CI = 0.45 to 0.56), indicating that the studies were significantly heterogeneous.

Further exploration of the data using stem and leaf-plot and heterogeneity plot (the effect sizes were plotted with three sampling standard errors) identified few extreme 'outliers' and studies with deviant effects. Close examination of effect sizes from studies such as *Alvermann, D.E. (1988) {1] [2], Kozminsky E., and Kozminsky, L., (2001) [1] [2], Wittrock, M.C., 1991[1], Wittrock, M.C., 1991[3] Wittrock, M.C., 1991[5] Rinehart, S.D Stahl, S.A., and Erickson, L.G., 1986 [1] and Yuri Sato, E., 1996 [1] Yuri Sato, E., 1996 [2] resulted in the exclusion of ten effect sizes from further analysis.*

In the second stage of the meta-analysis, effect sizes from multiple measures administered to the same group of students were averaged to yield a single effect size for that sample of students according to the construct they represent. In other words, an independent set of effect sizes were created and there were about *44 effect sizes from 24 studies for further analysis.* The mean effect size was computed, by weighting each effect size by the inverse of its variance. The result was *d=0.55 (Q=93.72, K=44, 95% CI 0.477 to 0.62).*

The Q value of reading comprehension was significant and ANOVA analog were executed where effect sizes were grouped into mutually exclusive categories on the basis of an independent variable. Summary of results from meta-analysis were reported in the table below.

Table 16
Summary of results from meta-analysis (Independent effect sizes)

	No. of studies	Mean effect size	95% Confidence Interval for *d*		
	K	*D*	*Lower*	*Upper*	*QT*
Total comparison with the control group	44	0.55	0.48	0.63	93.72*

Variable and Class	*K*	*D*	*Lower*	*Upper*	Q_w	Q_B
Type of outcome measure						24.41*
Reading comprehension	36	0.58	0.50	0.66	62.74*	
Vocabulary	4	-0.06	-0.49	0.38	4.05	
Writing	4	0.91	0.36	1.44	2.52	
Publication year	14	0.53	0.37	0.69	23.92*	0.8603
1980s						
1990s	19	0.61	0.5063	0.71	37.91*	
2000	3	0.55	-0.0933	1.19	0.05	
Publication type						5.3460
Journals	27	0.59	0. 50	0.68	46.00*	
ERIC	4	0.93	0.34	1.52	1.81	
Dissertations	5	0.44	0.16	0.73	9.58*	
Grade Level						12.21*
2-3	6	0.69	0.42	0.95	11.35	
4-6	15	0.55	0.44	0.65	28.05	
7-9	2	0.46	-3.71	0.46	0.18	
10-12	3	0.23	-0.47	0.93	5.75	
College	8	0.72	0.48	0.96	5.00	
Others	2	1.26	-3.04	5.55	0.21	
Type of students						11.41*
Mix ability	15	0.69	0.56	0.81	14.94	
Low ability	11	0.57	0.39	0.77	18.73*	
Average	9	0.37	0.20	0.55	17.45*	
High ability	1	0.41	-0.35	1.16	0.00	
Types of Reading						6.52*
Narrative	12	0.48	0.36	0.60	18.20	
Expository	24	0.68	0.57	0.80	38.02*	
Post-tests						0.95
Standardized test	8	0.51	0.31	0.71	15.83*	
Experimenter developed test	28	0.60	0.51	0.69	0.95*	
Instructors						3.57
Classroom teachers	9	0.56	0.43	0.68	28.93*	
Researchers	23	0.59	0.47	0.72	25.04	
Research assistance	2	1.05	-2.21	4.31	4.99*	
Others	2	0.55	-1.87	2.98	0.21	

Strategies used						20.55*
Direct Instructions	13	0.44	0.29	0.59	8.53	
Reciprocal teaching	7	0.67	0.50	0.84	19.77*	
Generative learning and use of motivation	5	0.76	0.39	1.12	4.01	
Graphics/visual/imagery	5	0.74	0.37	1.12	4.17	
Self-instruction and verbalization	3	1.02	0.29	1.76	3.25	
Questioning	3	0.35	0.13	0.82	2.47	
Methods of Assignment to groups						2.76
Stringent	10	0.71	0.51	0.90	9.62	
Less stringent	25	0.55	0.46	0.64	50.26*	
Length of Treatment						5.79
<15 days	13	0.49	0.34	0.65	16.23	
15-25 days	4	0.47	0.09	0.85	13.97	
>25 days	10	0.61	0.48	0.74	21.25	
No information	9	0.78	0.53	1.03	5.51	
Number of Sessions						0.67
1-5	13	0.60	0.44	0.75	22.92*	
6-10	2	0.58	-1.76	2.92	0.03	
>10	11	0.60	0.47	0.72	17.23*	
No Information	10	0.51	0.29	0.73	21.89*	
Sample Size						9.60*
1-45	14	0.80	0.58	1.01	16.22	
46-100	14	0.43	0.28	0.58	17.69	
>100	8	0.60	0.48	0.73	19.24*	
Transfer test						6.60*
Yes	25	0.56	0.44	0.68	46.78*	
No	10	0.73	0.53	0.93	7.32	

4.2 Research Questions

To examine the overall effectiveness of metacognitive reading strategies in reading and discover patterns inherent in combined studies that individual studies may not be able to do, the problem can be stated in the following research questions:

1. What is the overall effect of metacognitive strategy instructions on comprehension?

i) What is the effect of metacognitive strategy instruction on *reading comprehension?*

ii) What is the effect of metacognitive reading strategy instruction on *vocabulary comprehension*?

iii) What is the effect of metacognitive reading strategy instruction on *writtten assignment?*

2. Does the reported effect size biased because most of the research is taken from the journals?

3. Does the effect differ due to the variables associated with the study characteristics such as;

   a. **Publication characteristics**; year and publication type?

   b. **Subject characteristics**; grade level and ability level?

   c. **Instructional Characteristics;** type of materials used for reading, and post-tests measures, instructors during the treatment and the strategies used?

   d. **Design characteristics;** such as methods of assignment, the length of treatment in days, the number of training sessions, sample size?

4.3 Discussions and Conclusions

This investigation and analyses of moderator variables were considered exploratory in nature. The process of exploration revealed unexpected patterns or results and the interpretation requires a 'careful description, process analysis, insight and creativity' (Light and Pillemer, 1984). Such an interpretation would be a blend of qualitative information, with numerical information from the data analysis as an aid to thought. The following conclusions are drawn from the findings of the meta-analysis concerning the effects of metacognitive strategies on reading comprehension. The discussions will be based on the stated research questions and the results presented in the previous section;

4.3.1. What is the effect of Metacognitive strategy Instruction on comprehension?

(i). Reading comprehension

A medium effect of .58 for this variable implies that the reading comprehension of students in the experimental group improved from 50th percentile to 71st percentile after receiving metacognitive strategy instruction. Comparatively, the effect size was smaller than that by Haller (1988) that produced an effect size of .71, the treatment effects were consistent with the findings of other reviewers such as Huang (1991), .58, and Fan (1993), .56, however, the difference is not statistically significant. All of the effect sizes fall within the medium range. The meta-analysts reported the unbiased estimates of effect sizes; however, except for Fan (1993), both Haller (1998) and Huang (1991) did not indicate using correction factor to remove the bias of effect size estimates from studies with small sample sizes. Haller et al., (1998) employed a general linear model to analyse the distribution of effect size, whereas Huang, Z., (1991) and Fan. W., (1993) used Analysis of variance. In this investigation, ANOVA analog was employed to find the possible cause of excess variation. These results however suggest the importance of metacognitive strategy training and its potential for raising the students' scores and achievement on either standardized tests or other measures.

(ii) . Vocabulary comprehension

Only four primary research studies used vocabulary tests as the outcome measure of metacognitive strategy instruction. None of the studies indicates any training of metacognitive strategies to teach vocabulary comprehension. The negative

effect of -0.06 might imply that the strategies might be applicable to other assignments if they were taught vocabulary comprehension during the intervention.

(iii) Written assignment

This meta-analysis identified four studies that include written assignment as dependent measures. The mean effect size of .90, indicated that the students receiving metacognitive instructions would improve their written assignment from the 50th percentile to 81st percentile. A close examination of studies within this aggregation revealed that in three of the studies, the assessment was carried out on the young adult learners (the undergraduates) and the high school low ability group. One study from this aggregation carried out the instruction on the fourth grade high ability group. The treatment effect from this group was modest, 0.42 (Hare, V.C., and Borchardt, K.M., 1984) compared to the three other studies where the effect size was large ranging from 1.25 (Wittrock, M.C., 1991) to 0.98 (Alfassi. M., 1998) and 0.85 from (Boyle, O.F., 1986). Generally, the use of written assignment as a measure to assess the effects of metacognitive strategies would be appropriate depending on the students' grade level and ability.

In addition to the examining the effects of metacognitive strategies, this meta-analysis investigated the possible cause of excess variation in the dependent variable, reading comprehension. No further analysis was conducted on vocabulary comprehension and written assignment because the effect size estimates for the two variables were homogeneous. The next section will summarize the results of search for publication bias and ANOVA analog.

4.3.2. Is the reported effect size biased because most of the research is taken from the journals?

A scatter plot of effect size estimates versus sample size for a group of studies using metacognitive instruction to improve reading comprehension was plotted to see if there was any publication bias. A broad spread of points for the highly variable small studies at the bottom and decreasing spread as the sample size increase shows that publication bias was unlikely in this meta-analysis. The rank correlation test using *Kendall's tau and Spearman's rho* demonstrated no significant correlation between these two variables.

RANK CORRELATION (Effect vs. Sample Size)

Kendall's Tau

Tau -0.184
Z -1.575
Prob 0.11522

Spearman Rank-Order Correlation

Rs -0.230
Prob 0.17801

4.3.3 Study Characteristics

(i). Does the effect differ due to the variables associated with Publication characteristics; year and publication type?

ANOVA analog using fixed effects model was executed and these variables did not contribute to the variation in observed distribution of effect sizes. The analysis conducted on the year of publication revealed no significant difference between the recent studies conducted in the year 2000, or those studies in 1990s and 1980s. The results shows that studies within these years produced equally moderate

effect sizes and not all mean effect sizes for the three categories are statistically significant (as demonstrated by the 95% confidence interval plot for year 2000), this might be possibly due to the small sample size.

There was a greater treatment effect of studies from ERIC documents and a moderate effect from journals and dissertations. The statistical significance of the weighted effect size demonstrated by the 95% confidence interval plot on each of these categories provides further evidence that statistical significance does not always mean a lack of significance in terms of magnitude in treatment effect. However, this conclusion has to be viewed in relation to other moderators such as the students' ability level or the influence of results from a single study, which have an extreme value (outlier).

(ii) Does the effect differ due to Subject characteristics; grade level and ability level?

The analysis suggested that significant variation in effect sizes were associated with the subject characteristics. The effect were largest for the category of 'others' followed by the modest effects from the college group, Grade 2-3, Grade 4-6, Grade 7-9 and the least from Grade 10-12. These findings were examined in relation to the students' ability level. For example, the sample of students constituting the aggregation of 'others' was from the 'low ability' group and those from the college were either the 'at risk' students or the Mixed ability group. The analyses on Grade 2-3 and 4-6 revealed that the treatment effect on the low ability group within this category produced the greatest effect compared to students from the other ability groups. These findings were in contrast to the findings by Haller et al., (1988) which found the largest effects of strategy instructions for the seventh and eighth grades,

which, they argued that for the most part, would be emerging into formal operations stage. On the other hand, even the findings by Fan, W., (1993) discovered the beneficial effects of metacognitive instruction on students from different grade levels.

The results of the present finding discovered that, metacognitive strategy instruction were beneficial for students from different grade levels but the treatment effects would benefit the Low ability or Mixed ability group more than the other groups. These results, as well as those from Haller et al., (1988) and Fan. W., (1993) seem to indicate that conceptualising metacognitive awareness as increasing steadily with age may be erroneous. The increasing quantity and quality of children's metacognitive knowledge and monitoring skills through systematic training may be feasible as well as desirable (Flavell, J.H., 1979). The results might suggests that even the young adult learners (Or the adults) could be taught to make wise and thoughtful life decisions as well as to comprehend and learn better in formal educational setting. And therefore, the classroom teachers should be informed of the effectiveness of training or teaching the metacognitive strategies to their students. Thus, the wide implementation of metacognitive strategies should be encouraged.

(iii) Does the effect differ to the Instructional Characteristics; type of materials used for reading, and post-tests measures, instructors during the treatment and the strategies used?

Examination of variables related to instructions was carried out. Two instructional variables were found to be significantly associated with the variation in effect size. These include the type of materials used for reading and the various strategies/instructional strategies used during the treatment. In contrast to the results found by Huang, Z., (1991) in synthesizing studies on self-questioning strategies, the

use of expository text (social studies/science text) as reading materials in the studies yielded better treatment effects compared to narrative text. The effect sizes from both categories were significant (95% Confidence Interval). The use of self-questioning strategy might be useful for reading a narrative text compared to expository text. When studies using a single *questioning strategy* on the narrative text were combined, the effect was 0.34 compared to the studies using narrative text with *reciprocal teaching* as an instructional approach (0.73) where questioning strategy was combined with other strategies such as *summarizing, clarifying and predicting.* The hypothesis that metacognitive strategies have a positive impact on the use of narrative text could be true if viewed in relation to instructional strategies used during the treatment.

When the use of expository texts was viewed in relation to instructional strategies used during the treatment, the effects were largest when used with *generative learning or in combination with a motivational approach* d=1.09 (K=2, Qw=0.67) and *Verbalization,* d=1.02 (K=3, Qw=3.2*)* Thus, the type of reading materials used might depend on the various strategies employed for the treatment.

The type of strategies used during the treatment was significant. Studies using *self-instruction and verbalization strategy* reported favourably large significant effects *(d=1.02)* compared to the modest effect by studies using *generative learning in combination with motivation (d=0.76) use of graphic/visual/imagery (d=0.74) reciprocal teaching (d=0.67) direct instruction (d=0.44) and smallest effects when questioning strategy were used (d=0.34).* In general, caution must be made with the choice of instructional strategies. The use of metacognitive strategies in combination with verbalization and use of graphic/visual/imagery might improve students' performance in reading comprehension. Further analyses were made whether one instruction was more effective for a particular grade level or reading ability. In the

self-instruction and verbalization category, the effect size was higher for the younger average group compared to the Mixed ability group from the college. As for the generative learning in combination with the use of motivation, the effect was higher for the low ability group compared to the Mixed ability group. For graphic/visual/imagery category, the effects were similar for the Low ability from senior high school and Mixed ability group from college. Direct instruction seems to be more effective with the low ability group, compared to the other groups. Finally, the use of reciprocal teaching was favourable to the Mixed ability group. Suffice it to say, the effectiveness of a particular strategy might depend on the students' grade and ability. However, the inconsistencies and the small number of independent samples involved in the analysis suggest additional research for further clarification.

Homogeneity analysis was also conducted on other instructional variables such as the type of post-test used to measure the students' learning and the instructors involve in the training. The result shows non-significant difference between the standardized and experimenter developed test, indicating that both types of tests are equally effective in measuring the outcome of metacognitive strategies. The evidence from this finding and the study by Haller et al (1988) and Fan, W., (1993) supports the equal effectiveness of these two types of measures to assess the outcome of their research on reading comprehension.

Even though the research assistants seem to deliver the treatment effectively in the studies, the difference was not statistically significance. The treatments were equally successful whether the instructions were executed by the research assistants, researchers or the classroom teachers themselves. There is an implication that the researchers had successfully trained or transfer the instructional skill to the research

assistants or the classroom teachers. The wide implementation of metacognitive strategy instruction is possible.

(iv) *Does the effect differ due to the design characteristics; methods of assignment, the length of treatment in days, the number of training sessions, and sample size?*

Except for sample size, none of the design characteristics seems to contribute to the variation in effect size. The assignment of students to treatment conditions resulted in equally positive moderate outcome. This may indicate the practical value of classroom-based research and the use of intact classes bring similar results to the researchers. An equally effective result, with equally moderate significant effect size was found for the duration of treatment and the number of training sessions on the treatment group. The no significance difference implies that the researcher may not have to design a long intervention study to reach similar results with studies on shorter duration. This finding was similar to the result of study by Fan, W., (1993). Findings by Haller et al (1988) and Huang, Z., (1991) found a significant effect for studies with more training sessions. The inconsistencies suggest the need for further research.

In this investigation, studies with a sample size of 1-45 were considered small, 46-100 as medium and those more than 100 samples were considered large. The homogeneity statistics was significant. Studies with small sample size produced a large effect size compared to the medium and large sample size studies. The statistically significant results might reflect that Studies with smaller sample size allowed for greater experimental control compared to studies with large number of samples. However, studies with bigger sample sizes, with good research design also produced relatively positive treatment effects.

4.4.0 Implications and Recommendations drawn from meta-analysis

The findings of this study suggest a positive impact on students reading comprehension from 50th percentile to 71st percentile as a result of metacognitive training. The results of studies conducting transfer test or follow up test at the end of studies showed a similar outcome, an effect size of 0.56, implying a long consequence of the treatment effect. The improvement has a direct implication for educational instruction and research.

4.4.1 Educational Instruction

In terms of educational instruction, the data offered some convincing evidence on the effects of metacognitive strategies and metacognitive reading strategy training should be implemented in all classroom situations. Every teacher should be the reading teacher despite his or her specialisation areas. This might imply that the reading teachers should work hand in hand with subject teachers in other content areas in designing metacognitive programme which will foster learning for understanding. However, there is a need for further research to find out if the students trained in metacognitive strategies could apply the skills in the content area subjects to enhance their comprehension of the concepts or strategy use in their studies.

This meta-analysis reveals the need for the teachers, or researchers to consider the various instructional procedures or whether the particular method of teaching was effective for a particular grade level or reading ability level. The low ability learners, the learning disabled or children with special needs might need extra attention and motivation in learning. However, this does not mean that the adult learners could be denied metacognitive strategy instruction. The teaching of metacognitive strategies might increase the students' awareness in the use of effective reading strategies for learning and understanding. The findings from this analysis has

made it clear that even the low ability young adult learners needed to be taught the appropriate skills for reading, learning and understanding. Subsequently, further research is needed to explore the students' use of the metacognitive strategies to other learning situation.

The finding seems to indicate that the use of metacognitive strategy instruction has been successfully implemented on English as a second language learner's population that appears to be a neglected population. Separate meta-analysis should be conducted on this population. Even though the current primary research from two studies in this meta-analysis (e.g., Alfassi, M., 1998, and *Kinnunen, R., and Vauras, M., (1995)*) had consistently demonstrated large treatment effect, due to the limited number of quantitative research studies, the conclusion might be erroneous. More research effort should be conducted on this population. So far, the research effort has quite intensively focused on average, low ability learners or the younger group.

Generally, the medium effect size as indicated in the meta-analysis demonstrated the value of metacognitive reading strategy instruction in facilitating reading comprehension. With the findings of this study, the educators or administrators are encouraged to apply the strategies in reading classes as well as in other subject areas so that a wide implementation of metacognitive strategy instruction could be realized. Moreover, the curriculum unit or planners should include the metacognitive strategies as part of their existing curricula. Importantly, the teacher educators in pre-service and in-service should emphasize the prominent role of metacognitive strategies in students' reading comprehension and equip new teachers with the knowledge or skills relevant to reading instruction.

4.4.2 Research recommendation from meta-analysis

(i) Homogeneity tests; what influences the treatment results?

The results were pooled to give an overall estimate of effect sizes and the homogeneity tests were conducted to see the variables that might influence the overall effect size or the homogeneity statistics. The results revealed that homogeneity statistics were influenced by the population characteristics such as the Grade and ability level and instructional variables such as the type of reading materials and the various strategies/instructional strategies used during the treatment. These variables seem to have a significant effect on the treatment results and needed to be considered for future experiments or empirical investigations.

(ii) *Need for empirical investigations on the complex features found in meta-analytic Study*

Along with the positive findings, the current meta-analysis reveals the need for future empirical research as well as meta-analysis in the field of metacognitive strategy instruction;

a. Interplay of motivation; the use of motivation and attention in combination with generative learning strategies to improve students' comprehension were found to be effective with an effect size of $d=0.76$. The models of generative learning were based on four related parts: (1) students' knowledge base and preconceptions, (2) motivation, (3) attention and (4) generation (Wittrock, 1991). More research is needed into the complex interplay between enhanced motivation and metacognitive strategies training, and aspects of learning environments such as

collaborative or cooperative learning conditions as manifested in reciprocal teaching.

b. Verbalization; The meta-analysis indicated that the teaching of metacognitive strategies using *self-instruction and verbalization strategy* reported favourably large significant effects *(d=1.02)* compared to the teaching of metacognitive strategies through an instructional program emphasizing social and verbal interaction in reciprocal teaching where the effect size was *d=0.67.*

c. The use of questioning strategy; So far, this investigation has discovered that the use of single questioning strategy was d=0.34, which was in between the small and medium range compared to the finding by Huang, Z., (1991) on self-questioning strategy where the mean effect size was 0.58. More empirical research needs to be conducted on the conditions under which this strategy could be implemented. The strategy might be effectively used verbally (aloud or internally in their mind) depending on the students' particular grade level.

d. Grade level and ability; Most research effort in metacognitive reading strategy instruction covered on the Low ability and primary or elementary level students from Grade 4-12, and adult Low ability readers in college. More independent studies should be designed on the above-average and average adult population in college to draw conclusions on the efficacy of the metacognitive strategies on these populations. Current meta-analysis indicates that the adult Low ability readers are not aware of the effective

reading strategies or do not have enough conscious control over the reading process. It is doubtful that all the average students are aware or conscious of the effective reading strategies to monitor their learning and understanding.

(iii) Insight *into various patterns of findings and complex features across studies*

As far as research is concerned, the investigation discovered various patterns of findings and insights into various factors such as grade and ability levels, and other instructional or methodological variables that might contribute to the confusion in the results across studies. The meta-analysis into the complicated features demonstrated helped to understand when and how the strategies could be used by the educators to the students' advantage.

Admittedly, the current investigation could not answer all the questions about metacognitive strategies and its effect on reading comprehension. With the lack of sufficient information reported in many studies, it is not possible to examine the effect of other moderators such as the instructors' training, the location of the school and follow-up studies and so forth that might contribute to the excess variance.

(a) Separate meta-analyses

Separate meta-analyses should also examine the overall effect of research effort in computer assisted reading instruction and its relationship with metacognitive strategies. There is an increase in studies of computer-assisted instruction, and there would be enough data for the quantitative synthesis in this area.

(b) Alternative to significant testing

The synthesis of results from various primary studies using meta-analysis provided the researchers an overview of findings in which statistical significant of individual

results has no part (Coe, 1998). It is an alternative to statistical significance testing which has been criticized by Carver (1978) as a corrupt form of scientific method. According to Carver (1978);

> Statistical significance simply means statistical rareness. Results are 'significant' from a statistical point of view because they occur very rarely in random sampling under the conditions of the null hypothesis. A statistically significant mean difference between two research groups at the .05 level indicates the following: if we assume that the two research groups are random samples representing the same hypothetical population which has properties of the groups themselves, and if we assume that we samples 100 sets of two groups from the sample hypothetical population, then we would expect to find the mean difference between the two research groups to be larger than 95 of the 100 sampled from the hypothetical population. A statistically significant result means that the probability is low that we would get the type of results we got, given that the null hypothesis is true.

According to Cohen (1994), significance testing is a 'mechanical dichotomous decisions around a sacred .05 criterion which can be criticised on a number of accounts.

(c) Criticisms to significant testing

i. The straw-man hypothesis (The Null hypothesis)

The null hypothesis in statistically significant testing makes an assumption that the two-sampled group represent the same population and there is no difference between the two groups with respect to the treatment given. Any difference we find between the two means would have been due to chance alone or to the sampling fluctuations (Sampling error), which inevitably occur when samples are drawn from a common population. Rejecting the straw-man hypotheses is the same as rejecting the idea that the two groups are essentially equivalent or represent the same population.

ii. Leave out the size of the effect

Significance test do not tell us how big the difference was. Reporting the effect size from the experiments would have been more useful to provide information on the effect of the treatment.

iii. File drawer problem

Studies with non-significant results are unlikely to be published and this gives rise to the file drawer problem (Rosenthal, 1979). The file drawer problem refers to the over-representation in published work of statistically significant results leading to overall bias. The *research question* 2 in the Discussions section illustrates the graphical technique of identifying publication bias in this study by plotting Effect sizes against the sample sizes. It seems that publication bias is unlikely in this synthesis due to the inclusion criteria for primary studies included in this meta-analysis.

(iv) Sample sizes

In the traditional significant testing, small studies may have never been done because none of them have the sufficient power to achieve statistically significant results compared to the studies with large sample sizes. In fact, the failure to reject the null hypothesis tells us nothing more that the sample size was probably too small to achieve statistically significant results.

d) The graphical techniques

Obviously, the experience from the current meta-analytic study has shown that the graphical method of presenting the data provides a simple and flexible way to enable the data to be interpreted without statistical tests of any kind.

(e) Confidence Intervals.

In this meta-analysis, effect size was used as an index of difference between the two means. The observed difference is the best guess to the true difference and may not be totally accurate (Fitz-Gibbon, C.T., and Morris, L.L., (1987). Given the observed data, it might be useful to report the degree of precision of the estimate of the mean effect size. Thus, the effect sizes from primary studies were presented graphically in association with confidence intervals, which contains all the information in a null hypothesis test (Coe, 1998). Confidence intervals that include zero as a possible difference is equivalent to saying that the null hypothesis might be true: There might be zero true difference; the difference was not 'statistically significant'. Additionally, if the confidence interval does not include zero, then the mean effect size is statistically significant at the level specified by the confidence interval. Therefore, confidence intervals actually are another way of expressing statistical significance, which provides the same information in a way that, it is often argued, is more meaningful (Fitz-Gibbon, C.T., and Morris., L.L., (1987).

The possible cause of excess variance was investigated using ANOVA analog, which is best suited to test a limited number of priori hypotheses regarding moderator variables. However, the analyses were considered exploratory in nature and any conclusions based on these should be regarded as tentative. Despite its limitation, this meta-analysis has important implications. Generally, the results support the more widespread implementation of metacognitive strategies in reading comprehension. With the use of strategies such as *verbalization and graphic/visual/ mental imagery* in a *collaborative or cooperative* learning in combination with

attention and motivation, the students might improve their performance in reading comprehension.

The empirical evidence from this meta-analysis provides the policy makers, curriculum planners, and school administrator and teacher educators with the information to either implement or integrate the strategies into the existing curriculum. It is the challenge for the reading teachers and teachers in several content area subjects to teach their students to not only improve the overall achievement in reading for meaning but also monitor their learning in different subjects and giving proper guidelines for practising the strategy use. .

Finally, this investigation might forge stronger links between learning theory and practice, and the greatest challenge is in moving away from analysis to action. Effective action will require bridges among policymakers at national, state, institutional, and departmental levels and between practitioners and scholars across the disciplines. The collaboration among these groups may promote broader implementation of metacognitive strategies, not only in reading comprehension but also from different content area subjects.

Chapter five will describe the methodology and procedure to conduct the empirical investigation based on the findings of meta-analysis in this chapter. The review and the theoretical perspectives in chapter 2 will have to be considered for a better understanding of the reading processes and the adaptation of the research questionnaires included in the studies.

CHAPTER FIVE

The Empirical Study: Outline

Procedures, research design, materials used, factor Analysis, Reliability and validity

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5.0 Introduction

The meta-analysis revealed consistencies in the effectiveness of metacognitive strategies in terms of the effect size and suggest that the teaching of metacognitve strategies such as questioning, identifying main ideas, drawing inferences, summarizations, activating prior knowledge and webbing improves reading comprehension. The findings also revealed that the Grade and ability level, instructional variables (e.g. such as the type of reading materials used during the treatment and strategies used) and methodological factor such as the sample size might have influenced the results of the experiments included in the meta-analysis.

These findings are useful for further empirical investigations and based on these findings, it is essential to conduct research to find out the extent and the influence of these variables on the results of the empirical investigation. Accordingly, a small-scale partial replication of the experiment using metacognitive strategies was implemented.

5.2. The Research Questions

The research questions in this study are as follows:

1. What is the difference between the performance of students taught with metacognitive strategies and the students in the control group?

2. Is there any relationship between motivations, strategy use and students performance in reading comprehension?

3. Is there any difference between the motivational variables and self-regulated learning strategies (Cognitive and metacognitive strategies) with the learners performance before (Time 1) and after the instructions of metacognitive strategies (Time 2)?

4. What role does the length of treatment play in affecting the results of the treatment?

5.3. Procedures

5.3.1 Pre-treatment activities

i. Analysing the meta-analytic findings and reviewing the literature on the qualitative studies. Recommendations from the meta-analysis are crucial for the current investigation to identify the complex features that have a significant impact on the treatment from various studies included in the meta-analytic study.

ii. Identification of the metacognitive strategies designed to help students monitor their understanding of text and internalise the strategies for future use.

iii. Choosing, modifying and developing the teaching materials for the treatment and developing test items for the pre-tests.

iv. Developing the interview questionnaire, adapting and modification of the Questionnaire (MSLQ, Motivated strategies for learning questionnaire).

v. Correspondence, permission and approval

5.3.2 The correspondence and problems affecting the research

Prior to conducting the study, e-mail was received from the Secretary of ethics committee via Secretary of Research degree on 30th January 2001 to inform that the researcher's application for ethics approval and proposal for the research in connection with the thesis had received unanimous approval by ethics committee. A letter requesting research assistance was also granted by the University of Durham (Appendix C.1) immediately after the approval to conduct research in Malaysia was granted from the University of Malaysia, Sarawak (Appendix C.2). The application to conduct research in Malaysia was approved for only three months (March until May, 2001).

The researcher planned to conduct the research soon after the arrival to Sarawak. However, this was not possible due to the technical problems in the correspondence and approval of the application to conduct the research from the Ministry of Education, Malaysia. Only after consistent telephone calls to the Ministry of Education, Malaysia that on 9th March 2001, permission was obtained from the Educational Planning and Research Division (EPRD), Ministry of Education, Malaysia (Appendix C.3). The researcher was informed that the application letter, which was faxed and posted in November, was not received by the EPRD, Ministry of Education. Later, the approval letter was immediately faxed to the State Education Department (JPN) in Kuching, Sarawak for approval to carry out the actual research.

A letter of approval from JPN was also obtained on the 9th March 2001(Appendix C.4).

Following the approval from the State Education Department, the researcher immediately contacted the school principal of SM Methodist for permission to conduct the Pretest to the sixth form students in the school on 12th March 2001. The Motivated Strategies learning questionnaires (MSLQ) were given to the respondents immediately after the pre-tests. The intention of the study and instructions on how to respond to the questionnaire were explained to the teachers in charge.

The data was collected personally from the senior assistants and the teachers in charge. Upon the receipt of the completed questionnaires, the data were organized and analysed utilizing a computer program for statistical analysis. The contacts and timeline of the study are indicated in Table 17.

Table 17
Timeline of the Study

Date	Activity
January 30,2001	Approval from the Ethics Committee
March 9, 2001	Approval from the Ministry and schools
March 12, 2001	Pre-tests
March 12,2001	Administering MSLQ questionnaires to the Sixth form (First group) (Paper and pencils)
March 13-28, 2001 (Internet testing)	Delivering questionnaire MSLQ through the internet (Second group)
March 29- 3 May 2001	Treatment (Training of Metacognitive strategies)
4 May 2001	Immediate Post-tests Administering the second MSLQ questionnaires
7 May 2001	Students interview
14 May 2001	Teachers interview

Total number of questionnaires distributed for Paper and pencil test: 111
Total number of students for Internet testing: 105

5.3.3 Training for instruction

Teachers were contacted to arrange for a meeting about the research to be conducted at their school. Only two teachers were involved directly in the study to give instructions to the experimental classes, but the meeting were also attended by the other colleagues from the language and the General studies department who were interested in the teaching of metacognitive strategies.

The purpose of the meeting was to familiarize teachers with the goals and content of the instructional activities. Teachers were told that the aims of the study were (1) to assess the effects of training the sixth form students with the metacognitive strategies on the student's performance. (2) To find out if there is a difference between the relationship between the motivation, learning strategies and the student's performance before and after the treatment. Students in the two instructional conditions would be compared to each other as well as the students in the control group who were not presented with any strategies or any instructional program.

The head of General studies department and the colleagues reviewed the reading texts as well as the MSLQ questionnaire to be given to the students participating in the research. The teachers agreed that the materials were relevant to the syllabus in the General studies and the translated MSLQ questionnaire was comprehensible. The two teachers involved in the experimental classes were also given the instructions and training scripts (see appendix D) to be used during the treatment. The third teacher in charge of the control group was not given the script. This is to ensure standardized instructions across the two teachers and the two experimental groups. Training for the instructions was done during five days within two weeks before the treatment started.

5.3.4 The pre-test/post-test and training materials

There are ten passages with 5 multiple choice items administered for the pre-test and post-test in reading comprehension (See appendix E –Reading comprehension tests). The passages and the questions were adapted and modified by the researcher from various reading texts of the sixth form students in consultation with the teachers and head of department from various schools including the school involved in the investigation. The training materials were translated and adapted from materials used by Schroeder (1996) and other sixth form reading sources. The materials consist of passages appropriate for practice with the metacognitive strategies within the given time period as indicated during the pilot study.

The passages level of reading difficulty was measured using Fry Readability Graph (1977), the difficulty level ranged in difficulty from the 12^{th} grades to above the 17^{th} grades. Accordingly, the difficulties level of the multiple choice items at the pre-test and post-test are shown in table 18 below.

Table 18 Difficulty level of multiple choice items from Comprehension and Vocabulary test

No. of items	Tests	Comprehension	$\overline{X}p$	Vocabulary	$\overline{X}p$
50	Pre-test	P=0.24 – 0.97	0.63	P=0.20 – 0.97	0.50
50	Post-test	P=0.22 - 0.90	0.59	P=0.20 – 0.90	0.45

**The item difficulty is noted as the p value*

5.3.5 Assignment to conditions

The researcher was briefed by the head of the General studies department that the students' ability in the Arts stream classes was average. This was confirmed by their prior achievement in the Malaysian Certificate of Education and the pre-test results given by the researcher.

Initially, it was proposed by the researcher that the teachers were randomly assigned to the three instructional conditions. However, one of the teachers whowas a temporary teacher (untrained teacher) volunteered to go to the control group where the instruction were given in a traditional ' study and answer'condition. Finally, the other two teachers were allowed to choose voluntarily one of the experimental classes. whereas the students were assigned to the instructional conditions using the random digit numbers into three groups with 30 participants in each group.

The first and the second group were given the same treatment but under different instructional condition. Participants in the first group were allowed to work alone throughout the experiments and verbalized the content and strategies to themselves internally (in their mind). Participants in the second group worked in a group environment where they could discuss the content of the passages and verbalized the strategies they have learned. The instructions will be described in the next section under the 'Activities during treatment'.

Before the instructions, the students signed the consent form (see appendix C.5) to confirm their participation in the study. Participants were also told about their roles in this study of reading comprehension and that their confidentiality will be protected. The Class Numbers were used as their identification number for the questionnaires to replace their name*s*.

5.3.6 The Experimental Research

The first aim of the study was to answer the first research question, that is, whether the teaching of metacognitive strategies with verbalization will improve the student's performance. These pre-tests performances will be compared with the post-tests data to investigate the effects of the treatment on reading comprehension.

To determine the effects of metacognitive strategy instructions on student's performance, two instructional treatments were developed. The first treatment is on the teaching of four metacognitive strategies (hypotheses generation, question generation, summarization/paraphrasing) plus verbalization in a work alone task. The second treatment will engage the learners with the same metacognitive and cognitive strategies but in a Group task while the third group will serve as a control group receiving no instruction on the strategy use.

Performance of students across these conditions will be compared on measures of students' reading comprehension and vocabulary administered before and after the training.

(i) The research design

The research design used in this study can be represented as:

Experimental 1 Metacognitive strategies /Alone+Verbalization
Experimental 2 Metacognitive.strategies/Group+Verbalization
Control

RO_1	X	O_2
RO_3	X	O_4
RO_5		O_6

The pre-test and post-test control design used simple randomisation. Analysis of covariance was used as the means for controlling the initial difference between the experimental and control group on their pre-test mean scores on their performance.

(ii) Subjects

Pre-university level students (i.e. the sixth form students ages 18-19) were recruited for the study. They were selected for the following reasons. (1) This is a preparatory stage for higher learning and life after schools. They should be given the opportunity to learn the complex skills of comprehension in order to analyse, synthesize, evaluate and extrapolate information in preparation for higher learning. (2) These student are required to pass their national examination particularly the Malaysian Higher Certificate of Education (STPM) for entry requirements to universities or other institution of higher learning. One aspect of reading for comprehension is to prepare for an assessment. Monitoring for assessment purposes or study monitoring, involves the ability to focus on main ideas, implement an aid to learning, and concurrently evaluate the effectiveness of the strategy being applied (Baker & Brown, 1984). The students may need facilitation and guidance on intellectually complex skills of synthesis and comprehension on the road to intellectual maturity. (3) The students possessed the vocabulary and grammatical forms needed to read lengthy passages, (4) although students at this stage may be aware of the usefulness of a particular strategy, they may not spontaneously use it. Therefore, explicit instruction requiring the students to consciously monitor their comprehension seemed warranted.

5.3.7 Activities during treatment

(i) The experimental group

Students receiving metacognitive instructions (MET) plus verbalization were expected to perform better on measure of metacognition and comprehension than students receiving no instruction (CONTROL). The students in the Treatment Group

1 (MET +/ALONE) were engage in hypothesis generation before reading, generate questions and verbalized (internally) related to the comprehension text, summarize (paraphrase) the strategy used in a work alone task. Students in treatment Group 2 (MET/GROUP) were trained with the same strategies but the learners were allowed to discuss verbally and completed the task in Group Work condition *Hypothesis generation* will activate the subject's prior knowledge. *Questions* will urge the students to focus and engage the students in processing the text information related to the questions asked (Yuri Sato, 1996). The subjects have to *summarize and paraphrase* the passage to examine if the students have successfully monitored their comprehension. Subjects who have successfully monitored their comprehension were to represent the meaning of the passage accurately. Finally, verbalizing the strategies will enhance the student's usage and understanding of the strategies. Students in both instructional conditions were expected to learn more of the information in the text and will be tested and compared on achievement in the comprehension tests in the pre-test and post-test.

(ii) The sessions

The instructions and implementation of metacognitive strategies began in the experimental classes during social studies lessons. Care was taken to ensure that the researcher were not deeply involved in the instructions. Furthermore, the teachers were already trained before the start of the experiment. The researcher was only involved in assisting the teachers on the first day of the instruction to the experimental classes to clarify the definition of strategies to be taught on the handout. Therefore, any impact on the outcome would be the result of instructions from the teachers. The researcher was given two periods (40 minutes each period) for two days a week starting on the 29 March 2001 as arranged and agreed by the principal and the

department until the end of the May 2001. Excluding the holidays and the post-test, the instructions progressed for five numbers of sessions within the six weeks period for 80 minutes each day (see time-line of the study in table 17).

On the first day of instruction, the students in the two instructional conditions were told that they were going to learn some strategies that would help them to understand the text read and study for the coming national examination. The instruction were given by the teachers involved in the experiments and assisted by the researcher. The teachers told them that the strategies could be used flexibly for any subjects involving reading subjects. The students were given the description and definition of the strategies to be taught on the handout.

On the second day of instructions, the teachers modelled the use of the strategies before the students practiced the strategy used. On each day of the instructions, the students were given the reading texts and practiced the metacognitive strategies as had already been modelled and explained by the teachers in the first and second day of the instructions (direct instructions).

Additionally, on the second, third and fourth day, and fifth day the students were given the questionnaires to write down the metacognitive strategies used during the day. The students were also told that some of the strategies would be helpful for the post –test given toward the end of the experiment and subsequently on the coming national examination toward the end of the year.

(iii) Control group

No treatment was given to the control group but the reading materials for the training sessions of the experimental group were also given on each day for the traditional "Read and answer the questions". The questionnaire on the strategies used on each

day was also given. The Control group also experienced the testing of reading comprehension on the same pre-test and post-test on which the experimental group was tested. But, however there is a risk or problem of contamination where the students from the control group might discuss the questions or strategies given during the testing or training sessions with the experimental groups. In other words, the problem of contamination is unavoidable because the control group was in the same school.

5.3.8 Post-treatment activities

At the end of the sixth week of instruction in the use of metacognitive strategies, comprehension tests consisting of multiple-choice items were given to the three groups. The comprehension test (post-test) was given a day after the last day of the treatment whereas the MSLQ questionnaire were given immediately after the post-tests.

Observational data written by the students on each day of the instruction were collected to analyse what strategies the participant used and the reasons for using or not the metacognitive strategies being taught. Finally, the students and teachers were given the simple questionnaires to comment on the metacognitive strategies that they have learned.

5.4 Summary of procedures

Throughout this study, several techniques, quantitative and qualitative were used to determine whether the utilization of the metacognitive strategies would improve student' reading comprehension. Summary of procedures are displayed in table 19.

Table 19 Summaries of Procedures/Experimental Tasks.

Group 1(Work Alone	**Group 2 (Group work)**	**Control (study conditions)**
Pre-tests -Comprehension test	Pre-tests Comprehension test	Pre-tests -Comprehension test
Motivated strategies learning questionnaire (MSLQ)	Motivated strategies learning questionnaire (MSLQ)	Motivated strategies learning questionnaire (MSLQ)
Direct instructions Guidance and modelling on strategy use	Direct instruction Guidance and modelling on strategy use	No instructions
Group 1 * Students may use other appropriate strategies ***Pre-reading*** *-generate Hypothesis* ***While reading*** *-Generate question+verbalizing (covert)* ***Post reading*** -Summarizing -Paraphrasing/verbalizing (aloud in the mind)	**Group 2** * Students may use other appropriate strategies ***Pre-reading*** -generate Hypothesis ***While reading*** *Generate question+verbalize (overt)* ***Post reading*** -Summarizing -Paraphrasing/verbalizing (Verbally to their group)	**Group 3** Study and answer
Post test Comprehension test Motivated strategies for Learning Questionnaire (MSLQ|) Teachers questionnaires	**Post test** Comprehension test Motivated strategies for Learning Questionnaire (MSLQ) Teachers questionnaire	**Post test** Comprehension test Motivated Strategies for Learning Questionnaire (MSLQ)

The meta-analysis had helped to identify the instructional conditions under which the experiment would be carried out. It was on the basis of the findings, that this study was conducted. However, there are limitations on the experiments carried out.

The most important variable that was found in the meta-analysis to influence the effect on the treatment was the elapsed time. In this research, there was a short time period between the pre-test and post-test that the length of the instruction, supposed to be 12 sessions in 12 weeks was shortened to only 5 sessions within six weeks. This will be discussed in detail later in the findings of the study and the limitations sections.

5.5 Questionnaires

5.5.1 The MSLQ questionnaires

The items were adapted and modified from 'The Motivated Strategies for Learning Questionnaire '(MSLQ) both from Pintrich and De Groot (1990) and Pintrich et al. (1991) Permission was obtained from Pintrich (1990) to adapt the MSLQ. The MSLQ (Pintrich & DeGroot, 1990) included items on motivation, and self regulated learning components (cognitive strategy use and metacognitive strategy use). All items on MSLQ were rated on a 5-point Likert scale (1=*not at all true of me* to 5=*very true of me*).

5.5.2 Modification of the questionnaire

The scoring of MSLQ questionnaires were modified to a 5-point Likert scale (*1= not at all true of me to 5=very true of me.* All Items from the motivational scale (1 until 22) were adapted from Pintrich and De groot (1990) whereas items 24,26,32,38,39,40,

44,45 in the learning strategies scale (Cognitive and metacognitive strategies) and the three items on Peer learning were from Pintrich et al (1991).

5.5.3 Translation

The Questionnaire was translated into the Malay language by the researcher and was read by a Malay and English language expert. Both English and Malay versions of the questionnaires were presented for field-testing because the samples were from different ethnic groups. Some students might understand the English version better than the Malay language or vice versa.

5.5.4 Strategy use questionnaire

After each of the training passages was completed, a brief questionnaire on the strategies used (Appendix F.2) by each student in the experimental group was attached to observe the development and changes on the usage of the strategies during the training session. The researcher expected the responses to reveal the changes in the strategies used as the treatments progressed.

5.5.5 Teachers and students Feedback (opinion/response)

After the treatment, questionnaires (see Appendix F.3 and F.4) for the teachers and students questionnaires) were given after the post-test to the teachers and students involved in the study to elicit their response and comments on what the students have learned from the instructional program.

5.5.6 The reading passages

Both the reading passages for the pre-tests and the training passages were shown to an experience teacher from the General studies Department to verify if the passages were appropriate for the sixth form. In order to verify the amount of times students would need to complete each task and the appropriateness of these tasks in terms of level of difficulty and clarity, the four short training passages, comprehension questions, motivated learning strategies questionnaire, and the training scripts were pilot tested with a group of three sixth form students.

Initially the three students completed the four reading passages for the training sessions within 1 hour-1 hr 17 mins. All three students read each text with guidance and administration instruction and scripts from the researcher, which included modelling of the comprehension and metacognitive strategies. Two students were allowed to complete the tasks e.g. generate hypotheses, generate questions, summarize, and finally verbalize aloud the strategies in pairs whereas the other student completes the reading tasks alone.

All three students completed the MSLQ questionnaire without any assistance. They were able to complete the questionnaire in 10-15 minutes, and complete reading the four short training passages using the four strategies in 1 hour-1hr 17 mins. They had no difficulty applying the strategies or completing the reading comprehension measures and the administrative instructions and scripts were also clearly understood and followed.

Pilot test results therefore verified the time needed to complete each task and for each passage: generating hypothesis 1-2 minutes, 5-6 minutes for reading and question generation, 5 minutes for answering reading comprehension, 4-5 minutes for summarizing.

The three students verbalised the strategies used during reading comprehension. The researcher was told that the first strategy did not take so much time and is very helpful to answer the reading comprehension questions at the end of the passages. Question generation was useful to find the main ideas and subsequently for summarizing and paraphrasing. Verbalizing the strategies used only took each of the participants 3 –4 minutes.

5.6 Internet testing

Initially, all the students were supposed to respond to the MSLQ questionnaire through the Internet. The lack of computer facilities in the school led the researcher to change the earlier plans. The students were then divided into two groups, the first group will respond to the paper MSLQ questionnaire immediately after the pre-tests whereas the second group were supposed to use their own personal computer or go to the cyber cafe to respond to the on-line MSLQ questionnaires. The instructions on how to access the website and password were given to the students to enable them to access the on-line questionnaires. At the end of the second week, some students turned to the researcher for the paper questionnaires or request the researcher and the teachers involved to fill in their responses for them on-line. The researcher had to conform to the requests because the students were already told about the intent of the research questionnaires and wanted to know the feedback.

Interestingly, under these circumstances the paper questionnaire was faster but the researcher was unable to give immediate response due to the time spent on keying in the data. Due to lack of computer facilities and network problem, the online delivery of the questionnaires was slowed down. Furthermore, the intent of the research was for the students to respond immediately or not very long after answering

the pre-tests. The on-line MSLQ questionnaires would be very useful and helpful for this research if the schools were equipped with more computers and network. Therefore, under these circumstances the data from the first group (Paper questionnaires) were more useful for the study and were factor analysed as described in the following section. However, the feedback from on-line testing group was also given to the students as promised.

5.7 Reliability and Validity

Reliability referred to the extent to which an experiment or a test, or any measuring procedure yields the same results on repeated trials (Carmines & Zeller, 1979). In short, reliability means consistency or interpreted as the extent to which a measure is consistent in producing the same reading when measuring the same phenomenon. There are several ways of measuring the reliability of a scale, such as test-retest reliability, internal consistency and the split-half method. Here, the reliability of motivation and learning strategies scales were measured by the Cronbach alpha internal consistency method. The value of the Cronbach alpha was calculated with the all the items included and with each of the item deleted in turn. The removal of an item might increase or decrease the value of alpha. The item-total statistics for each of the items and the sum of other variables in a construct was also calculated to check if the correlation was high enough to suggest the inclusion or omission of each of the items.

While reliability concerns the degree to which results are consistent across repeated measurements, validity in contrast, is usually more of a theoretically oriented issue because it inevitably raised the question, 'valid for what purpose?' Thus, one validates not the measuring instrument itself but the measuring instrument in relation to the purpose for which it is being used (Carmines and Zeller, 1979). In general,

validity indicates the extent to which any measuring instrument measures what it is intended to measure (Carmines and Zeller, 1979; Cohen and Manion, 1994).

It is a necessary condition of establishing validity of motivational and the learning strategies scales (cognitive and metacognitive self-regulated learning strategies) are interpretable (face validity). The review of the literature (chapter 2) and the meta-analytic study had identified some of the characteristics, which had been found to be significant in improving the student's performance. These include the cognitive and metacognitive learning strategies and motivation.

There were 22 items (a1 to c22) measuring the students' motivation and 25 items (d23 to d49) measuring cognitive and metacognitive self-regulated learning. The items were adapted and selected from the motivated strategies for learning questionnaires (MSLQ) which have been empirically used in other research, were modified and translated to match the individual context of Malaysia. In this case, factor analysis was conducted to check the factorial structure of the instrument, identify factors presumably underlying the variables (Kerlinger, 1986) or the underlying construct or theoretical dimensionality of a set of items. The construct refers to the theoretical construct of motivation and learning strategies that may explain the phenomenon of individual's behaviour. Finally, the results were inferred with theoretical guidance and theories of learning such as motivation and metacognition in relation to performance in reading comprehension in order to see if the results were in accordance with these assumptions.

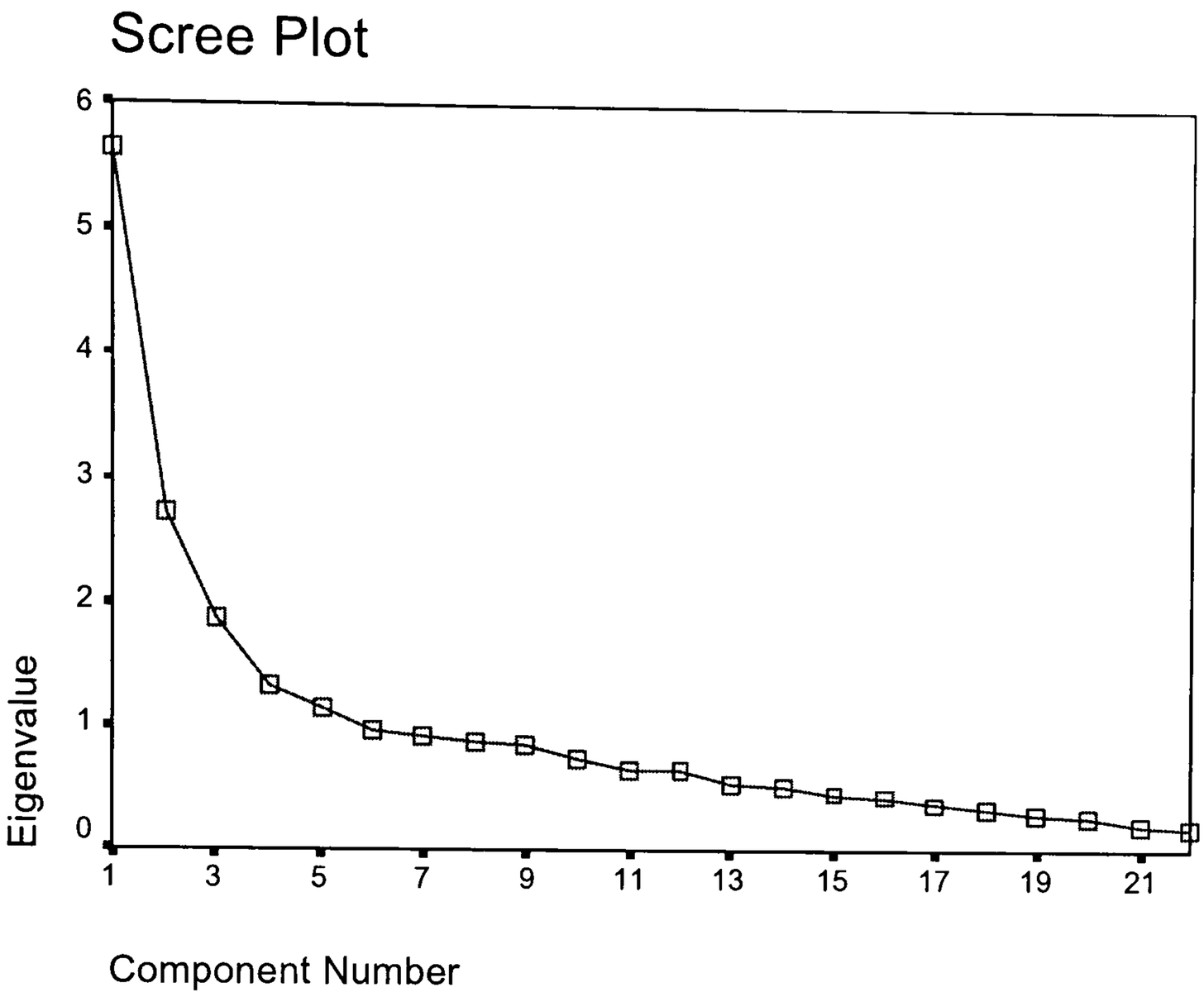
5.7.1 Factor Analysis

Table 20
Structure of the instrument

Parts	Factorial structure of the instrument	Items
A. Motivation	**Expectancy components** a. Expectancy for success b. Self-efficacy	a1 to a9
	Value Components a. Intrinsic goal orientation	b10 to b18
	Affective component (Test Anxiety) a. Worry or cognitive component. b. Emotionality component	C19 to 22
B. Cognitive and metacognitive strategies	Cognitive strategies a. Rehearsal b. Elaboration c. Organization d. Critical thinking	d23-d36
	Metacognitive strategies a. Planning b. Monitoring c. regulating	e37-e46
	Resource management strategies a. Peer Learning strategy	f47-f49

Two separate factor analysis were conducted. First factor analysis was conducted on Part A of the instrument and secondly on Part B. The factors were initially extracted using Principal components Analysis and five interpretable factors with eigenvalues greater than 1.0 were identified for Motivation scale in the study. The application of scree test suggested three factors to be extracted for factor rotation. The figure below shows the eigenvalues plotted against the number of the components in the scree test.

Figure 23



As shown in the above figure, the line changes in between the component of factor number 3 and 4. Finally, three factors were extracted using Principal component analysis, which accounted for 46% of the variance and rotated orthogonally using VARIMAX and obliquely using OBLIMIN. Both produce similar results. Each of the three factors had had substantial loadings precisely where predicted. Table 56 shows the result obtained from the factor analysis.

Table 21 Rotated Component Matrixes on Part A (Motivation Scale)

Rotated Component Matrix

	Factor Loadings		
Items	1	2	3
A1. Compared with other students in this class I Expect to do well	.203	.677	.111
A2 I'm certain I can understand the ideas taught in this course	.354	.273	-.163
A3. I expect to do very well in this class	.234	.568	.226
A4 Compared with other students in this class, I think I'm a good student.	.102	.684	

A5 I am sure I can do an excellent job on the problems and tasks assigned for this class.	.399	.423	.100
A6. I think I will receive a good grade in this class.	.294	.704	
A7. My study skills are excellent compared with others in this class.		.787	-.104
A8. Compared with other students in this class I think know a great deal about the subject.		.675	-.222
A9. I know that I will be able to learn the material for this class.	.365	.290	
B10. I prefer class work that is challenging so I can learn new things.	.621	.119	
B11. It is important for me to learn what is being taught in this class.	.759		
B12 I like what I am learning in this class.	.757	.145	
B13. I think I will b e able to use what I learn in this class in other classes.	.502	.208	-.123
B14. I often choose paper topics I will learn something from even if they require more work.	.433	.280	
B15. Even when I do poorly on a test I try to learn from my mistakes.	.620	.177	.120
B16. I think that what I am learning in this class is useful for me to know.	.770		.219
B17 I think that what we are learning in this class is interesting.	.710	.178	
B18.Understanding this subjects is important to me.	.345		-.149
C19. I am so nervous during a test that I cannot remember the facts I have learned.	.105		.823
C20. I have an uneasy, upset feeling when I take a test.		-.124	.809
C21. I worry a great deal about tests.			.764
C22. When I take a test I think about how poorly I am doing.			.625
Eigenvalue:	5.6	2.7	1.8
% Variance explained	25.6	12.3	8.5

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 5 iterations.

As a rule of thumb, only variables with loading of .30 and above are interpretable.

That is to say, a loading of 0.3 or more is frequently taken as meaningful when interpreting a factor. Factor 1 was identified as intrinsic goal orientation. Six items 10, 11, 12, 15, 16, 17, from 'Intrinsic goal orientation' as defined by Pintrich and De Groot (1990) loaded highly exceeding 0.5 on factor 1 whereas three of the items loaded above 0.3. (Item 13, 14, 18). However, three measures or items from 'Expectancy component: self-efficacy for learning and performance' loaded above 0.3

on this factor. When the three items were further examined, item 2, 5 and 9 could also be grouped into Intrinsic goal orientation component because the items not only reflects the students judgements or confidence about one's ability to accomplish a task, but also the degree to which the student perceives herself to be participating for reasons such as challenge and mastery. However, the three items were retained in the Expectancy component of self-efficacy for learning and performance.

Factor 2 with high loading from five items; items 7, 6,4,1,8 were identified as Expectancy component of self-efficacy for learning and performance whereas item 3 and 5 loaded exceeding 0.5. Item 2 and 9 loaded poorly on this factor; however, they were also included in the expectancy component of self-efficacy for learning and performance factor after further examination of the variables. Finally, the four items (19, 20, 21, and 22) loaded highly on factor 3 integrativeness. This subscale was best identified as Affective or Test Anxiety component.

The reliability of the factors was further tested with Cronbach's alpha. The next section will describe the internal consistency of each subscale from the Motivation Scale. The item-total statistics for each of the items and the sum of other variables in a construct was calculated. If the correlation between an item and the scale in which it was not included was high enough to suggest that its inclusion might increase the alpha reliability of the scale, the alpha value was recalculated with the item included.

5.7.2 Internal reliability of the motivation scale

The table below presents the cronbach coefficient alpha and item-total statistics for the items from each of the three subscales obtained. The reliability of the measurement is expressed by coefficients alpha.

Table 22 Reliability analysis of motion scale

Factor 1

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

N of Cases = 111.0

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
B10	31.0090	19.4817	.5231	.3417	.8082
B11	30.4144	20.2631	.6384	.4530	.7929
B12	30.9910	19.3545	.6751	.5105	.7866
B13	31.3514	21.9936	.4376	.2626	.8150
B14	30.6036	21.7869	.4114	.1955	.8181
B15	30.3514	21.3209	.5193	.3368	.8066
B16	30.4685	19.8513	.6296	.4687	.7928
B17	31.0360	19.4169	.6457	.5066	.7901
B18	30.3153	23.0724	.2586	.1215	.8331

Reliability Coefficients 9 items

Alpha = .8234 Standardized item alpha = .8218

Factor 2

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

N of Cases = 111.0

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
A1	25.0811	16.8752	.5619	.3976	.7720
A2	25.6126	18.4758	.3344	.1631	.8017
A3	25.0811	16.8934	.4994	.4073	.7810
A4	25.8649	16.8634	.4938	.3956	.7820
A5	25.5946	17.5887	.4820	.3496	.7828
A6	25.4955	17.0341	.6596	.4866	.7623
A7	26.1081	16.9882	.5995	.5206	.7679
A8	26.1532	17.8945	.4915	.4102	.7820
A9	25.3514	18.5572	.3475	.2083	.7992

Reliability Coefficients 9 items

Alpha = .8010 Standardized item alpha = .8040

Factor 3

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

N of Cases = 111.0

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
C19	10.1982	7.4695	.6533	.4504	.6708
C20	10.1982	8.0695	.6336	.4384	.6852
C21	10.0901	8.1918	.5695	.3359	.7179
C22	10.4054	9.0251	.4433	.2005	.7807

Reliability Coefficients 4 items

Alpha = .7711 Standardized item alpha = .770

Apparently from the above tables, it can be seen that items which were deleted to increase the consistency of scale were also the same as those items that loaded poorly on that factor.

5.7.3 Internal reliability of Part B (learning strategies scale)

Factor analysis was conducted on the second part of the instrument consisting 25 items. The factors were extracted by using Principal components analysis and eight factors with eigenvalues greater than 1.0 were identified. The scree test suggested retaining 3 factors for the rotation with varimax, which accounted for 40% of the variance. Table 23 below shows the result obtained from the factor analysis.

Table 23. Rotated Component Matrix on Part B (Cognitive and metacognitive strategies Scale)

	Factor Loadings		
Items	1	2	3
D23. Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.	.465	.423	
D24. I often find myself questioning things I hear or ready in this course to decide if I find them convincing.	.636		.131
D25 It is hard for me to decide what the main ideas are in		.309	.194

what we read.			
D26 When I study I write summaries of main ideas from readings.	.485	.249	.209
D27 When I study I put important ideas into my own words.	.576	.284	
D28 When I study for a test I try to remember as many facts as I can.	-.105	.422	.557
D29 When studying, I copy my notes over to help me remember material.	.563	.205	.247
D30 When I study for a test I practice saying the important facts over and over to myself.	-.118	.752	.227
D31 I use what I have learned from old homework assignment and the textbook to do new assignments.	.186	.633	
D32. When a theory, interpretation or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.	.646	.345	.153
D34 When I read material for this class, I say the words over and over to myself to help me study	.391	.449	.146
D35 I outline the chapters in my book to help me study.	.297	.423	
D36 When reading, I try to connect the things I am reading about with what I already know.	.577	.244	.199
E37 I ask myself question to make sure I understand the material I have been studying.	.636		
E38 When reading a passage, I make up questions to help focus my reading	.752		
E39 When I become confused about something I'm reading, I go back and try to figure it out.		.213	.502
E40 If the materials are difficult to understand, I change the strategy/way I read the material.	.182		.578
E41 Before I begin studying I think about the things I will need to do to learn.	.349	.302	.396
E42 I often find that I have been reading for class but don't know what it is all about	.110	.124	
E44 When studying for this course I try to determine which concepts I don't understand well.	.147		.734
E45 When I study, I set goals for myself in order to direct my activities in each study period.	.576		.495
E46 I try to change the way I study in order to fit the subject's or course requirements and instructor's teaching style.	.251	.181	.557
F47 When studying for this course, I often try to explain the material to a classmate	.283	.395	.283
F48 I try to work with other students from this class to complete the course assignments.	.241	.596	
F49 When studying for this course, I often set aside time to discuss the course material with a group of students from the class.	.274	.449	.268
Eigenvalue:	4.3	3.0	2.6
% Variance explained	17.3	12.2	10.4

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a Rotation converged in 9 iterations .

All the three factors have substantial loadings from most items. Eight items loaded highly on factor 1 exceeding 0.5. The items include 24,27,29,32, 36, 37, 38, and 45. Item 23, 26 and 34 loaded exceeding 0.3. These items were identified as cognitive strategy scale. Further examination of the items shows that item 37 and 38 could also be metacognitive strategies because both involve questioning strategies. Questioning strategies could also be cognitive or metacognitive.

Three items; item 30,31 and 48 loaded above 0.5 on factor 2 and item 25,28,32,34,35, 41, 47 and 49 loaded above 0.3. The items loading on this factor were identified as the rehearsal and organizational strategies of learning, which could also be grouped into the cognitive strategies scale and the peer-learning factor.

Items 28, 39,40,44,46 loaded highly on factor 3 and two items, item 41 and 45 loaded above 0.3. Six items loadings on this factor were identified as metacognitive strategies except item 28, which was identified as rehearsal strategy. This item also loaded on factor 2 with factor loading of 0.42.

It is interesting to learn from the factor analysis that the cognitive and metacognitive strategies intertwined. Further theoretical analysis of the items and the structure of the factorial loadings show that Part B belongs to the cognitive and metacognitive strategies Scale. However, it could be further subdivided into three subscales: a) the cognitive strategies b) metacognitive self regulated learning strategies and c) Peer learning strategies.

As shown in table 19, the cognitive strategies consists of four components; the elaboration strategies, critical thinking, organization and rehearsal. The cognitive strategies in learning were examined on the theoretical base as described in table 19. Items 26,27, 31, 32 and 36 were the elaboration strategies; items 28, 30 and 34 were the rehearsal strategies, items 23,24 and 25 included in critical thinking and finally

item 29 and 35 as the organization strategy. The reliability of factors in cognitive strategies was tested with Cronbach's alpha. Table 24 below presents the Cronbach's alpha for the four components in the cognitive strategies. The reliability coefficients alpha for the total of 13 items is .81, which is comparable to the internal consistencies estimates of .83 by Pintrich and De Groot (1990).

Table 24

The reliability coefficients alpha (Cognitive strategies)

Subscale: Cognitive strategies	Number of items	Reliability Coefficients alpha	Standardized Item Alpha
Elaboration	5	.6901	.6942
Critical thinking	3	.4242	.4213
Rehearsal	3	.5853	.5856
Organization	2	.3148	.3146

The metacognitive self-regulation involves three general processes such as planning, monitoring and regulating. The items identified as the planning processes were item 44 and 45, item 37, 38 and 42 as the monitoring processes whereas the regulating processes included item 39, 40 and 46. The reliability coefficient for the nine items was found to be .70, also comparable to the internal consistency estimates of .74 by Pintrich and De Groot (1990).

Table 25

The reliability coefficients alpha (Subscale: Metacognitive strategies)

Subscale:Metacognitive strategie	Number of items	Reliability Coefficients alpha	Standardized Item Alpha
Planning	3	.6393	.6375
Monitoring	3	.3869	.3858
Regulating	3	.5113	.5087

Finally, as predicted there are only three items on peer learning strategies, which includes items 47, 48 and 49. The three subscales were then tested with reliability analysis. The results were shown in Table 26 below.

Table 26

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

N of Cases = 111.0

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
D23	39.6847	55.2724	.4915	.3768	.7940
D24	39.6306	56.7441	.4313	.3738	.7989
D25	39.6306	60.8351	.1560	.1420	.8175
D26	39.7387	54.7402	.4884	.3387	.7939
D27	39.5586	54.1034	.5154	.4168	.7916
D28	38.6486	58.7027	.3372	.2760	.8054
D29	39.9099	52.4827	.5226	.3677	.7906
D30	39.2342	55.5446	.4167	.5279	.8000
D31	39.7387	55.5584	.4002	.3377	.8015
D32	40.1261	53.3839	.6193	.5178	.7837
D34	39.8108	53.8457	.4820	.4228	.7944
D35	39.2162	54.6256	.4083	.2319	.8015
D36	39.2342	54.7446	.5085	.3576	.7925

Reliability Coefficients 13 items

Alpha = .8102 Standardized item alpha = .8085

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

N of Cases = 111.0

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
E37	26.3423	24.2636	.3481	.2110	.6902
E38	26.8108	22.8821	.4447	.3156	.6712
E39	25.2613	25.4311	.2865	.1290	.7002
E40	25.7568	24.0403	.3882	.2137	.6827
E41	25.9730	23.9356	.3725	.2503	.6857
E42	26.1441	26.6881	.1083	.0521	.7348
E44	25.9279	23.4675	.4612	.2781	.6694
E45	25.9550	21.2616	.6099	.4233	.6354
E46	25.9910	23.6272	.4457	.2848	.6723

Reliability Coefficients 9 items

Alpha = .7088 Standardized item alpha = .7081

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)

N of Cases = 111.0

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
F47	5.8559	3.3790	.4037	.1816	.5025
F48	4.9910	3.3908	.3495	.1273	.5799
F49	5.9640	2.9078	.4706	.2263	.3967

Reliability Coefficients 3 items

Alpha = .5979 Standardized item alpha = .5975

5.7.4 Descriptive statistics and scale correlation with the post-test grade

Table 27 below presents the means, standard deviations and the correlations with the post-test grade for each item and scale. The size of the correlation is a direct indication of the amount of the validity (Nunnaly, 1978). As shown in table 27, the scale correlations with the post-test grade demonstrated the moderate statistical validity of the instrument. However, one can still generalize the scores from one variable to another variable from the size of the correlations indicated in the table.

The meta-analysis had identified certain attributes or variables found to be significant in enhancing the student's performance. These include the motivational variables consisting of Expectancy component, value component, and affective component and self-regulated learning components (cognitive and metacognitive strategies). The description on the theoretical concepts of motivational variables and self-regulated learning were discussed in chapter 2, whereas the definition of each of the components or that make up each of the scale were explained under each of the table below.

Table 27

Expectancy component: Self-efficacy for learning and performance

Items	Mean	Std.Deviation	Correlation with final grade
A1	3.64	.87	.24
A2	3.17	.88	.04
A3	3.66	.95	.20
A4	2.90	.96	.23
A5	3.19	.87	.19
A6	3.28	.75	.27
A7	2.63	.81	.20
A8	2.58	.73	.12
A9	3.43	.82	.09
Scale	3.16	.54	.28

The two aspects of expectancy includes in this scale are the expectancy for success and self –efficacy. Expectancy for success refers to performance expectations, and relates specifically to task performance. Self-efficacy is a self-appraisal of one's ability to master a task. Self-efficacy includes judgments about one's ability to accomplish a task as well as one's confidence in one's skills to perform that task, Pintrich et al (1991).

Table 28

Value component: Intrinsic goal orientation

Items	Mean	Std.Deviation	Correlation with final grade
B11	3.61	1.10	.12
B12	4.20	.84	.06
B13	3.63	.94	.02
B14	3.22	.72	.20
B15	3.94	.85	.11
B16	4.21	.77	.11
B17	4.19	.81	.10
B18	3.53	.91	.26
Scale	4.20	.81	.06
	3.89	.54	.173

Intrinsic goal orientation concerns the degree to which the student perceived herself to be participating in a task for reasons such as challenge, curiosity, and mastery. Having an intrinsic goal orientation towards an academic task indicates that

the student's participation in the task is an end to itself, rather than participation being a means to an end (Pintrich, 1991).

Table 29
Affective: anxiety

Items	Mean	Std.Deviation	Correlation with final grade
C19	3.41	1.23	-.065
C20	3.38	1.14	-.135
C21	3.52	1.19	-.152
C22	3.17	1.12	-.113
Scale	3.37	.88	-.154

Test anxiety has also been found to be negatively related to expectancies as well as academic performance in the previous study by Pintrich et al (1991). Test anxiety is thought to have two components; a worry component, or cognitive component, and an emotionality component. The worry component refers to students' negative thoughts that disrupt performance, while the emotionality component refers to affective and physiological performance has been found to b e the greatest sources of performance decrement. Training in the use of effective learning strategies and test-taking skills should help reduce the degree of anxiety. Pintrich et al (1991).

Table 30
Cognitive strategies scale: Means, standard deviations and correlation with final grade:

Items	Mean	Std.Deviation	Correlation with final grade
D23	3.17	1.03	.17
D24	3.24	.94	.06
D25	3.20	.95	-.11
D26	3.04	1.07	.10
D27	3.26	1.14	.01
D28	4.21	.87	-.15
D29	2.94	1.29	.17
D30	3.63	1.12	-.09
D31	3.16	1.14	.02
D32	2.74	1.03	0.14
D34	3.08	1.25	0.28
D35	3.68	1.28	-.07
D36	3.62	1.08	.12
Scale	3.31	.60	.062

The four cognitive strategies included in this scale are; the rehearsal strategies, which involves reciting or naming items from a list to be learned. According to Pintrich et al (1991), these strategies are best used for simple tasks and activation of information in working memory rather than acquisition of new information in long-term memory. On the other hand, the elaboration strategies help students to store information into long-term memory by building connections between items to be learned. These include paraphrasing, summarizing, creating analogies and generative note-taking which will help the learners to integrate and connect new information with prior knowledge. The next cognitive strategies included in this scale would be critical thinking. Critical thinking refers to the degree to which students report applying previous knowledge to new situations in order to solve problems, reach or make critical evaluations with respect to standards of excellence. Finally, the organization strategy helps the learner to select appropriate information and construct connections among the information to be learned. The strategies include clustering, outlining, and selecting main idea in reading passages. Pintrich et al (1991) suggested that these strategies should result in better performance.

Table 31

Metacognitive Strategies (Self regulated learning strategies):
Means, standard deviations and correlation with final grade

Items	Mean	Std.Deviation	Correlation with final grade
E37	2.91	1.12	.19
E38	2.49	1.17	.30
E39	4.07	.90	-.02
E40	3.52	1.00	.22
E41	3.32	1.10	.16
E42	3.07	1.13	-.09
E44	3.32	1.03	.25
E45	3.24	1.12	.16
E46	3.37	0.97	.27
Scale	3.26	.59	.29

As had already been discussed in chapter 2, metacognition refers to the awareness, knowledge, and control of cognition. The three general processes that make up the meta-cognitive self-regulatory activities included in this questionnaire are: planning, monitoring and regulating. The definitions of these three activities according to Pintrich et al (1991) are:

> Planning activities such as goal setting help to activate, or prime, relevant aspects of prior knowledge that make up organizing and comprehending the material easier. Monitoring activities include tracking of one's attention as one reads and self-testing and integrating it with prior knowledge. Regulating refers to the fine-tuning and continuous adjustment of one's cognitive activities. Regulating activities are assumed to improve performance by assisting learners in checking and correcting their behavior as they proceed on a task.

In addition, the three processes define an awareness that may be one of the most important factors in reaching critical evaluation with respect to the standards of excellence and applying previous knowledge to new situations to solve problems and reach decisions (Garcia and pintrich, 1992).

Table 32
Resource management: Peer learning

Items	Mean	Std.Deviation	Correlation with final grade
F47	2.48	1.05	.21
F48	3.46	1.07	.15
F49	2.42	1.12	.16
Scale	2.79	.82	.23

The last scale that makes up the questionnaire was referred to as the Resource management: Peer learning by Pintrich et al (1991). Pintrich et al (1991) suggested that dialogues with peers could help learner clarify course material and reach insights one may not have attained on one's own.

5.8 Summary

The reliability analysis and the correlation with the final grade on each of the scale resulted in the exclusion of four items from the cognitive strategies scale (item 25, 28, 30, 35) and one item from the metacognitive scale (item 42). These items were excluded due to the weak correlation with the final grade. The scale correlation with the final grade increased from .06 to 0.20 after the exclusion of four items from cognitive strategies scale. As for the metacognitive scale, the correlation increased from 0.29 to 0.32. (See appendices for summary of subscales and correlations of Total MSLQ with final grade and performance).

In the next chapter, the statistical test of analysis of covariance was used to analyse the data to answer the first research question. In addition, a correlational analysis was also conducted to find out the relationship between the motivation, learning strategies and the student's performance, which will answer the second and the third research question. Finally, the qualitative data were collected and analysed to elicit responses from the participants regarding the strategies used on each day of instructions and to obtain their comment on the metacognitive strategies they have learned. Subsequently, this study could be divided into two areas of research; the experimental research and the correlational study whereas the data collected are both quantitative and qualitative data. The tests data were statistically analysed using Ancova and correlation, whereas the information from the questionnaire was examined for themes common among respondents from the experimental groups.

CHAPTER SIX

Quantitative measures: Results and Discussion

What is the impact of metacognitive strategies on Students' Performance?

6.0 Introduction

This chapter will present the findings of the empirical investigations following the research questions outlined in chapter five. The first research question concerned the difference in students' performance in reading comprehension and vocabulary tests between the three groups. Separate univariate analyses were conducted on performance in reading comprehension and vocabulary tests because in meta-analysis, both outcomes were treated separately.

6.2 What is the difference in students' performance in reading comprehension and vocabulary tests between the three groups?

6.2.1 Comprehension

Firstly, preliminary one-way ANOVA detected no significant difference between the three groups on the pretest reading comprehension ($F = .246$, $p = .782$) as expected. Table 32 shows the means and standard deviations obtained from one-Way ANOVA on Pre-tests and the unadjusted means and standard deviation from the Post-tests. Before ANCOVA was run, gender differences were examined in preliminary analyses. Both males and females did not differ on performance in reading comprehension in the pre-test and post-test. There was no significant gender by

group interaction (F= .379, p= .686). Next, Analysis of Covariance was conducted with and without motivational variables as covariate. The results of ANCOVA with pre-test in reading comprehension as the covariate were shown in table 33,34,35 The univariate test on post-tests scores revealed no significant difference between the three groups at 0.05 level (F=1.25, p= 0.291).

The second ANCOVA with pre-test in reading comprehension and motivational variables as covariates also revealed no significant difference between the three groups at 0.05 level (F=. *83*, p=. *44*).

Table 33 Descriptive statistics (Means and standard deviations)

Dependent Variable: Comprehension

	Pre-test			Post-test		
Group	Mean	Std. Deviation	N	Mean	Std. Deviation	N
1	55.47	8.44	30	63.40	8.52	30
2.	56.40	10.18	30	61.00	10.37	30
3	54.80	7.82	30	59.47	10.37	30
Total	55.56	8.79	90	61.29	9.82	90

*1=Experimental Grp.1 (metacognitive/alone), 2=Experimental Grp 2 (metacognitive/group work)
3= Control grp.(no metacognitive instructions)

Table 34: Analysis of Covariance

Tests of Between-Subjects Effects
Dependent Variable: Post-Comprehension
(With pre-test in reading comprehension as covariate)

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
PRE	756.862	1	756.862	8.581	.004
GROUP	221.211	2	110.605	1.254	.291
Error	7585.804	86	88.207		
Corrected Total	8578.489	89			

a R Squared = .116 (Adjusted R Squared = .085)

Table 35: Estimates

Dependent Variable: Post-Comprehension

	Mean	Std. Error	95% Confidence Interval	
GROUP			Lower Bound	Upper Bound
1.00	63.430	1.715	60.021	66.838
2.00	60.719	1.717	57.305	64.133
3.00	59.718	1.717	56.305	63.131

*1=Experimental Grp.1 (metacognitive/alone), 2=Experimental Grp 2 (metacognitive/group work)
3= Control grp.(no metacognitive instructions
a Evaluated at covariates appeared in the model: Pre-Comprehension = 55.56.

Table 36: Pairwise Comparisons

Dependent Variable: Comprehension

		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
(I) GROUP	(J) GROUP				Lower Bound	Upper Bound
1.00	2.00	2.710	2.427	.802	-3.216	8.637
	3.00	3.712	2.426	.389	-2.212	9.636
2.00	3.00	1.001	2.432	1.000	-4.937	6.939

*1=Experimental Grp.1 (metacognitive/alone), 2=Experimental Grp 2 (metacognitive/group work)
3= Control grp.(no metacognitive instructions
Based on estimated marginal means
An Adjustment for multiple comparisons: Bonferroni.

Table 37: Analysis of Covariance

Tests of Between-Subjects Effects
Dependent Variable: Post-Comprehension
(With pre-test in reading comprehension and motivational variables as covariates)

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Pre-comprehension	425.616	1	425.616	5.177	.026
Self-efficacy	74.664	1	74.664	.908	.343
Intrinsic goal orientation	332.239	1	332.239	4.041	.048
Test-anxiety	3.892	1	3.892	.047	.828
Cognitive strategy use	1.528	1	1.528	.019	.892
Metacognitive self regulation	323.853	1	323.853	3.939	.051
Peer learning	29.125	1	29.125	.354	.553
GROUP	136.328	2	68.164	.829	.440
Error	6576.826	80	82.210		
Corrected Total	8578.489	89			

a R Squared = .233 (Adjusted R Squared = .147)

Table 38: Estimates

Dependent Variable: Post-Comprehension

	Mean	Std. Error	95% Confidence Interval	
GROUP			Lower Bound	Upper Bound
1.00	63.000	1.689	59.640	66.361
2.00	59.992	1.700	56.608	63.375
3.00	60.874	1.722	57.448	64.301

*1=Experimental Grp.1 (metacognitive/alone), 2=Experimental Grp 2 (metacognitive/group work)
3= Control grp.(no metacognitive instructions
a Evaluated at covariates appeared in the model: Pre-Comprehension = 55.56, Self Efficacy = 3.1877, Intrinsic goal orientation = 3.7296, Affective: Test anxiety = 3.1528, Cognitive Strategy Use = 3.4496, Metacognitive self-regulation = 3.3247, Peer learning = 2.8481.

Table 39: Pairwise Comparisons

Dependent Variable: Post-Comprehension

		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
(I) GROUP	(J) GROUP				Lower Bound	Upper Bound
1.00	2.00	3.009	2.404	.643	-2.870	8.888
1.00	3.00	2.126	2.450	1.000	-3.865	8.117
2.00	3.00	-.883	2.474	1.000	-6.932	5.167

*1=Experimental Grp.1 (metacognitive/alone), 2=Experimental Grp 2 (metacognitive/group work)
3= Control grp.(no metacognitive instructions
Based on estimated marginal means
a Adjustment for multiple comparisons: Bonferroni.

2.1.1 Effect size from ANCOVA

Adjusted Effect size estimates

The difference between the experimental and control group covariance adjusted-means were converted into effect size using Glass, McGaw and Smith equation;

$$\overline{g_E} - \overline{g_C} = (\overline{Y_E} - \overline{Y_C}) - b_{y.x} (\overline{X_E} - \overline{X_C})$$

Where $b_{y.x}$ is the pooled within groups estimate of the regression of final status, Y, on initial status, X. Using the usual notation for the Covariance adjusted mean, then,

$\overline{Y_E} - \overline{Y_C} = \overline{g_E} - \overline{g_C}$ (Glass, McGaw and Smith, 1981).

Given the MS_{error} from the ANCOVA, the metric for the standard deviation in the context of an analysis of covariance was;

$$S_p = \sqrt{\frac{MS_{error}}{1-r}\left(\frac{df_{error-1}}{df_{error-2}}\right)}$$

Where MS_{error} is the pooled within-group mean square after adjusting for the covariate, r is the correlation between the outcome variable and the covariate, and df_{error} is the df for the MS_{error} . (Rosenthal, 1994)

Given the above equation, difference between the experimental and the control covariance adjusted means and the adjusted effect size from the results of the first ANCOVA with pre-comprehension test as the covariate were shown in Table 40.

Table 40

Covariance adjusted mean	Experimental Group 1	Experimental Group 2
	63.43	60.72
$\overline{Y_E} - \overline{Y_C} = \overline{g_E} - \overline{g_C}$	Difference: Grp 1-3	Grp 2-3
	3.5	0.52
Adjusted Effect size Δ	0.36	0.05

With pre-comprehension test and the motivational variables as covariates the results were as follows:

Table 41

Covariance adjusted mean	Experimental Group 1	Experimental Group 2
	63.00	59.99
$\overline{Y_E} - \overline{Y_C} = \overline{g_E} - \overline{g_C}$	Difference: Grp 1-3	Grp 2-3
	1.9	-1.36
Adjusted Effect size Δ	0.20	-0.14

6.2.2 Vocabulary

Analyses of covariance were also conducted on the vocabulary test. Table 43, 44, 45 shows the results of ANCOVA with only pre-test on vocabulary as the covariate whereas table 46, 47, 48 shows the results of ANCOVA with both pre-test on vocabulary and motivational variables as the covariates.

Table 42: Descriptive Statistics (Means and Standard Deviations)

Dependent Variable: Vocabulary test

	Pre-test			Post-test		
Group	Mean	Std. Deviation	N	Mean	Std. Deviation	N
1.00	44.87	7.35	30	47.67	10.56	30
2.00	46.20	11.31	30	51.47	8.57	30
3.00	49.73	10.11	30	49.07	11.14	30
Total	46.93	9.84	90	49.40	10.16	90

*1=Experimental Grp.1 (metacognitive/alone), 2=Experimental Grp 2 (metacognitive/group work)
3= Control grp.(no metacognitive instructions

Table 43:

Analysis of Covariance

Tests of Between-Subjects Effects

Dependent Variable: Post-Vocabulary

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
PREVOC	153.466	1	153.466	1.499	.224
GROUP	219.351	2	109.676	1.071	.347
Error	8804.534	86	102.378		
Corrected Total	9179.600	89			

a R Squared = .041 (Adjusted R Squared = .007)

Table 44:

Estimates

Dependent Variable: Post-Vocabulary

	Mean	Std. Error	95% Confidence Interval	
GROUP			Lower Bound	Upper Bound
1.00	47.949	1.862	44.248	51.650
2.00	51.567	1.849	47.891	55.243
3.00	48.685	1.874	44.960	52.409

*1=Experimental Grp.1 (metacognitive/alone), 2=Experimental Grp 2 (metacognitive/group work)
3= Control grp.(no metacognitive instructions

a Evaluated at covariates appeared in the model: Pre-Vocabulary = 46.93.

Table 45:

Pairwise Comparisons

Dependent Variable: Post-Vocabulary

		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
(I) GROUP	(J) GROUP				Lower Bound	Upper Bound
1.00	2.00	-3.618	2.617	.511	-10.007	2.771
	3.00	-.736	2.668	1.000	-7.251	5.779
2.00	3.00	2.882	2.642	.835	-3.569	9.333

*1=Experimental Grp.1 (metacognitive/alone), 2=Experimental Grp 2 (metacognitive/group work)
3= Control grp.(no metacognitive instructions
Based on estimated marginal means
a Adjustment for multiple comparisons: Bonferroni.

Table 46:

Analysis of Covariance

Tests of Between-Subjects Effects

Dependent Variable: Post-Vocabulary

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Pre-vocabulary	129.832	1	129.832	1.292	.259
Self-efficacy	4.521	1	4.521	.045	.833
Intrinsic goal orientation	323.540	1	323.540	3.220	.077
Test-anxiety	.910	1	.910	.009	.924
Cognitive strategy use	137.568	1	137.568	1.369	.245
Metacognitive self regulation	4.683	1	4.683	.047	.830
Peer learning	66.229	1	66.229	.659	.419
GROUP	123.407	2	61.703	.614	.544
Error	8039.154	80	100.489		
Corrected Total	9179.600	89			

a R Squared = .124 (Adjusted R Squared = .026)

Table 47:

Estimates

Dependent Variable: Post-Vocabulary

	Mean	Std. Error	95% Confidence Interval	
GROUP			Lower Bound	Upper Bound
1.00	48.69	1.88	44.95	52.43
2.00	51.12	1.88	47.38	54.85
3.00	48.39	1.92	44.57	52.21

a Evaluated at covariates appeared in the model: Pre-Vocabulary = 46.93, Self Efficacy = 3.1877, Intrinsic goal orientation = 3.7296, Affective: Test anxiety = 3.1528, Cognitive Strategy Use = 3.4496, Metacognitive self-regulation = 3.3247, Peer learning = 2.8481.

Table 48:

Pairwise Comparisons

Dependent Variable: Post-Vocabulary

		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
(I) GROUP	(J) GROUP				Lower Bound	Upper Bound
1.00	2.00	-2.43	2.66	1.00	-8.94	4.09
	3.00	.30	2.75	1.00	-6.43	7.03
2.00	3.00	2.72	2.75	.97	-3.99	9.44

Based on estimated marginal means

a Adjustment for multiple comparisons: Bonferroni.

Accordingly, effect size was also calculated using Glass, McGaw and Smith adjustment equation. The results were shown in table 48 and 49 below.

Table 49 (With pre-test in vocabulary as covariate)

	Experimental Group 1	Experimental Group 2
Covariance adjusted mean	47.95	51.57
$\overline{Y_E} - \overline{Y_C} = \overline{g_E} - \overline{g_C}$	Difference: Grp 1-3	Grp 2-3
	-5.24	-0.35
Adjusted Effect size Δ	-0.49	-0.03

Table 50 (With pre-test in vocabulary and motivational variables as covariate)

	Experimental Group 1	Experimental Group 2
Covariance adjusted mean	48.69	51.12
$\overline{Y_E} - \overline{Y_C} = \overline{g_E} - \overline{g_C}$	Difference: Grp 1-3	Grp 2-3
	-4.20	1.90
Adjusted Effect size Δ	-0.39	0.18

6.2.3 Summary of results from ANCOVA

Comparing the effect sizes from the performances (Comprehension and Vocabulary) obtained from the experiments in relation to the findings from the meta-analysis

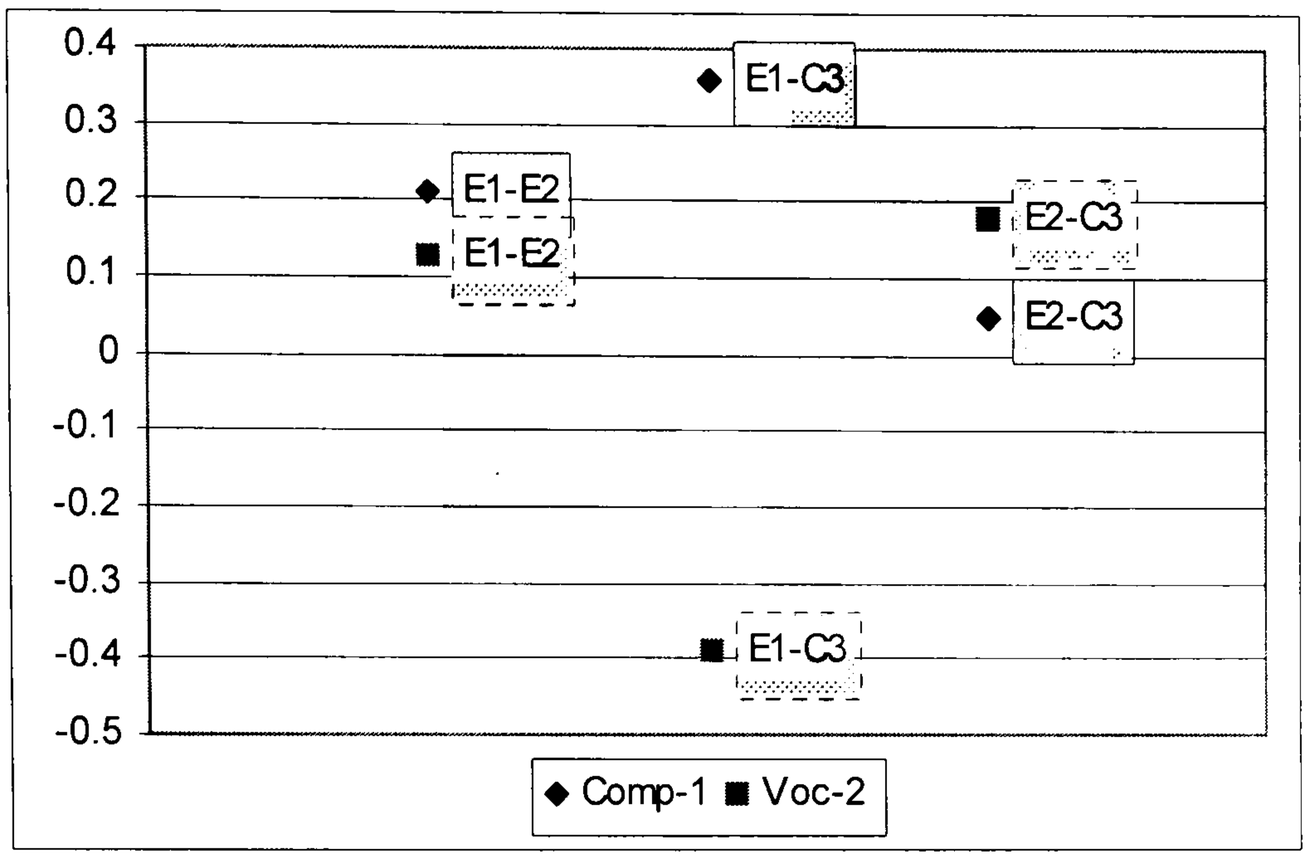
(i) Effects of time (length of treatment)

Due to the time constraints, the training session was conducted for only five sessions. From the meta-analysis, the effect size obtained for the five training sessions was moderate, i.e. *d=0.60* compared to the effect size obtained from the investigation on reading comprehension which is d=*0.36* from experimental group 1(work alone condition). The effect was only 0.05 for experimental group 2 (group work condition). The outcome from the Vocabulary test in group 1 was negative, that is, -0.39, whereas in group 2 was positive , d=0.18. These are comparable to the findings from the meta-analysis which was d=-0.06. It is possible that the length of the investigation and the number of training sessions had a significant effect on the results of the experiment. Another possible effect that might be relevant to the time factor is the student's ability. According to the model of school learning by Caroll (1963), students' ability or aptitude is another determinant of time needed for learning.

Comparatively, the impacts of the metacognitive strategies are more positive on reading comprehension than on the vocabulary. The participants in the experimental group 2 seem to gain from the Group work conditions in term of vocabulary test. The Graph in figure 24 summarizes the Effect sizes obtained from the Comprehension and vocabulary test.

Figure 24

Effect Sizes (Between groups) from Reading comprehension and Vocabulary outcome



E1-E2=Experimental group 1 compared to Experimental group2,
E1-C3=Experimental group 1 compared to Control group3
E2-C3=Experimental group 2 compared to control group3

(ii) Ability

As described earlier, students' ability is another factor that might influence the treatment effect and relevant to the time needed for learning the given tasks. According to Caroll (1963), the time needed for learning the tasks varies according to the student's aptitude, and the aptitude may depend upon the characteristics of the learner in mastering the learning tasks.

The samples used in this research were the average group. Compared to the findings from the meta-analysis which was d=0.37, the results of the treatment was similar to experimental group 1 students (i.e. d=0.36) in a work alone condition. The effect was however 0.05 for experimental group 2 (group work condition).

(iii) Sample size

From the meta-analysis, studies with sample size less than 46 had an effect size of 0.60. The finding from this small-scale experiment with 30 students in each group supported the findings where the effect of the treatment on reading comprehension was moderate for the experimental group 1 where the effect was 0.36 for reading comprehension in work alone condition. However the effect was small, that is, 0.05 in a group work.

(iv) Instructor

The use of classroom teachers as instructors for the training sessions in the meta-analysis produced an effect size of d=0.56. This is similar to the finding of this investigation, which was 0.36 for reading comprehension in a work alone condition and a small effect of 0.05 for instructors working with participants in a group work.

(v) Type of reading materials

In the meta-analysis the result was d=0.49 when the reading materials used was a combination of narrative and expository type which is equally moderate to the result from this experiment where the participants were working alone as in group 1. The effect was 0.05 for participants reading the same reading materials in group.

6.2.4 Conclusions

Results from Analysis of covariance found no significant difference between the scores of the experimental and the control groups at 0.05 level. When the difference between the experimental and control group covariance adjusted-means were converted into effect size, the effect size of reading comprehension was within

the modest range. These results provide an empirical base to support the findings from the meta-analysis. The effect sizes from the experiments were consistent with the outcomes from the meta-analysis such as reading comprehension and vocabulary tests which were *0.36 and 0.18* respectively. In both meta-analysis and the current experiment, the impact of metacognitive strategies was greater on reading comprehension than on the vocabulary outcome.

The comparison to the findings from the meta-analysis such as the time variables, sample size, the students' ability group, and the reading materials used in this empirical investigation also provide the answers to the reasons why the effect sizes for reading comprehension and vocabulary test obtained from this investigation were modest and small.

CHAPTER SEVEN

What is the relationship between motivation, self-regulated learning strategies (cognitive and metacognitive) and performance before and after the experiment? Does the experiment have any impact on the students' motivation?

7.0 Introduction

This chapter will present the findings from the correlational analysis between the student's motivation, self-regulated learning variables (cognitive and metacognitive learning strategies) and student's performance from the pre-tests and post-tests. This is followed by a comparison of motivational variables and self regulated learning subscale means at the pre-test and post-test. The data were gathered using motivated strategies learning questionnaires and were correlated with the participants' reading scores in the pre-test and post-test.

7.2 What is the relationship between Motivation, self-regulated learning (cognitive and metacognitive learning strategies) and performance before and after the experiment?

7.2.1 The overall sample and by group comparison at time 1 (pre-test) and time 2 (post-test)

(i) Bivariate relationship for the overall sample at the pre-test and post-test

The table below for pre-test (Time 1) indicates negative relationship between the motivational variables with performance in reading comprehension except for self-efficacy which shows a very low correlation of r=.047. Even metacognitive self-

regulation components and peer learning also indicates a very low correlation of r=.041 and r=.118 with reading comprehension.

Table 51

Correlations for the overall sample at the pre-test

	comprehension	Vocab	self efficacy	Intrinsic: goal orientation	Affective: test anxiety	Cognitive strategy use	Metacognitive self-regulation	Peer learning
comprehension	1.00							
vocab	.15	1.00						
Self efficacy	.05	-.12	1.00					
Intrinsic: goal orientation	-.00	-.14	.58**	1.00				
Affective: test anxiety	-.04	.09	-.06	.027	1.00			
Cognitive strategy use	-.07	-.02	.50**	.52**	.24*	1.00		
Metacognitive self-regulation	.04	-.04	.50**	.59**	-.02	.67**	1.00	
Peer learning	.12	-.05	.31**	.24*	.14	.59**	.49**	1.00
Means	55.56	46.93	3.16	3.89	3.37	3.14	3.28	2.79
SD	8.79	9.84	.54	.54	.88	.69	.64	.82

N=90

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

In regards to vocabulary, all correlations were negative except for anxiety which was r=.087. Other variables such as self-efficacy, intrinsic goal orientation, cognitive strategy use, metacognitive strategies and peer learning were positively correlated with one another except for anxiety which was negatively correlated with self-efficacy (r = -.056) and metacognitive self-regulated strategies (r= -.017) Test anxiety was only significantly related with cognitive strategy use (r=.237) and showed positive correlation with peer learning (r=.140) and intrinsic goal orientation (r=.027)

The relationship between cognitive strategy use and metacognitive self-regulated learning is significant (r=.670).

Table 52
Correlations for the overall sample at the post-test

	Comprehension	Vocabulary test	Self efficacy	Intrinsic: goal orientation	Affective: test anxiety	Cognitive strategy use	Metacognitive self-regulation	Peer learning
Comprehension	1.00							
Vocabulary	.33	1.00						
Self efficacy	.25	.18	1.00					
Intrinsic: goal orientation	.07	.26	.66**	1.00				
Affective: test anxiety	-.06	-.00	-.21*	-.02	1.00			
Cognitive strategy use	.09	.03	.47**	.55**	-.00	1.000		
Metacognitive self-regulation	.30	.18	.70**	.74**	-.03	.63**	1.000	
Peer learning	.25	.16	.47**	.32**	-.20	.27*	.526**	1.00
Means	61.29	49.40	3.19	3.73	3.15	3.45	3.32	2.85
SD	9.82	10.16	.68	.64	1.01	.77	.640	.91

N=90 samples
** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Compared to the pre-test (time 1), except for *self-efficacy* and *metacognitive* strategies there were non-significant positive relationship between the *motivational variables and the learning strategies with reading comprehension. The relationship between Test* anxiety and reading comprehension remain negative. The vocabulary test was also positively correlated with the other variables except for test-anxiety. On the other hand, the correlations between *self-efficacy and intrinsic goal orientation with cognitive strategy use, metacognitive strategies and peer learning* were still significant. As predicted, the *correlation between cognitive and metacognitive self-regulated strategies also remains significant* as in time 1. The correlation between *self-efficacy and intrinsic goal orientation* (r= .658), *self-efficacy and metacognitive strategies* (r= .702) remain significant at the post-test. At time 2, anxiety component

were negatively related to the entire motivational variable and the learning strategies components.

(ii) Paired t-tests between the variables at the Pre-test and Post-test

The overall sample

The mean levels of comprehension increase from time 1 to time 2; paired t-tests indicate that the increase in reading comprehension was statistically significant (*t=4.93, p=0.000)*. Except for intrinsic goal orientation (t=2.97, p=.004), anxiety (t=2.13, p=0.036), and cognitive strategy use (t=2.074, p=.04), other variable did not increase significantly from time 1, these include vocabulary test (t=1.77, p=.079), metacognitive self-regulated strategies (t=1.08, p=.282) and peer learning (t=.681, p=.497).

7.2.2 By Group relationship with performance

The analysis on the differences in correlation between the three groups also indicates that except for metacognitive components in group 2 there was no significant relationship between the motivational variables, and learning strategies to performance in reading comprehension at pre-test. The correlation improves at the post-test where there is a significant relationship between *comprehension with peer learning and metacognitive components (self-regulated learning strategies) in-group 2. In-group 1, t*here seems to be an increase in the correlation coefficient of *vocabulary test* with the performance in reading comprehension at the Post-test. It is also important to note that there is a change in the correlation coefficient of the motivational variables and learning strategies components from negative non-significant relationship to positive non-significant relationship at the post-test in the control group.

Table 53
By group -relationship between Motivation, learning strategies variables (Cognitive and metacognitive) and performance in reading comprehension and vocabulary at the Pre-test

	Comp	Vocab	Self-efficacy	Intrinsic Goal orientation	Anxiety	Cognitive strategy use	Metacognitive Self regulation	Peer learning
Self-efficacy								
Grp 1	.03	.07						
Grp 2	.18	.02						
Grp 3	-.12	-.383*						
Intrinsic goal orientation								
Grp 1	.01	.05	.53**					
Grp 2	.04	.00	.67**					
Grp 3	-.09	-.32	.57**					
Anxiety								
Grp 1	-.21	-.07	.05	.04				
Grp 2	-.07	.12	-.01	.17				
Grp 3	.12	.21	-.28	-.15				
Cognitive strategy use								
Grp 1	-.20	.26	.56**	.54**	.40*			
Grp 2	-.05	-.11	-.96**	.25	-.04			
Grp 3	-.12	-.08	.48**	.61**	.21			
Metacognitive Self regulation								
Grp 1	-.02	.17	.43*	.46*	.17	.64**		
Grp 2	.08	-.04	.40*	.39*	-.28	.59**		
Grp 3	-.00	-.09	.65**	.77**	-.03	.73**		
Peer learning								
Grp 1	.20	-.03	.32	.16	.18	.38*	.41*	
Grp 2	-.00	-.15	.25	.09	-.09	.70**	.40*	
Grp 3	.16	.06	.36	.38*	.21	.69**	.63**	
Comprehension								
Grp 1	1.00	-.24	.03	.01	-.21	-.20	-.02	.20
Grp 2		-.00	.18	.04	-.07	-.05	.08	-.00
Grp 3		.34	-.12	-.09	-.091	-.12	-.00	.16

*Correlation is significant at the 0.05 level (2-tailed)
** correlation is significant at the 0.01 level (2 tailed)

Table 54

By group- relationship between Motivation, learning strategies variables (Cognitive and metacognitive) and performance in reading comprehension and vocabulary at the Post-test.

	Comp	Vocab	Self-efficacy	Intrinsic Goal orientation	Anxiety	Cognitive strategy use	Metacognitive Self regulation	Peer learning
Self-efficacy								
Grp 1	.13	.16						
Grp 2	.34	.26						
Grp 3	.30	.13						
Intrinsic goal orientation								
Grp 1	-.12	.29	.75**					
Grp 2	.09	.09	.56**					
Grp 3	.23	.31	.65**					
Anxiety								
Grp 1	-.16	.09	-.07	.09				
Grp 2	-.16	.11	-.13	-.23				
Grp 3	-.09	-.20	-.45	0.30				
Cognitive strategy use								
Grp 1	.18	-.12	.24	.43*	.01			
Grp 2	.34	.04	.62**	.56**	.01			
Grp 3	.11	.22	.60**	.66**	-.36			
Metacognitive Self regulation								
Grp 1	.03	.10	.70**	.78**	.14	.41*		
Grp 2	.63**	.16	.62**	.56**	-.08	.74**		
Grp 3	.-34	.25	.82**	.82**	-.40	.72**		
Peer learning								
Grp 1	.02	.01	.26	.15	-.06	-.12.	.35	
Grp 2	.50**	.08	.54**	.22	-.12	.65**	-.58**	
Grp 3	.26	.29	.62**	.51**	-.47**	.60	.62**	
Comprehension								
Grp 1	1.00	.38*	.13	-.12	-.16	-.10	.02	.02
Grp 2		.31	.34	.09	-.16	.30	.58**	.88
Grp 3		.38*	.30.	.23	.09	.155	.29	.29

*Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2 tailed)

(i) Paired t-tests between the variables at the pre-test and post-test –by group

Table 55

Comparison of means (Motivational variables, self-regulated learning strategies and performance) at the pre-test and post test

	Self-efficacy		Intrinsic goal		Test-anxiety		Cognitive strategy use		Metacognitive strategies		Peer learning		Comprehension		Vocabulary	
Grp	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
1	3.17	3.16	3.92	3.62	3.30	3.18	3.10	3.41	3.27	3.38	2.5	2.73	55.47	63.40	44.87	47.67
2	3.24	3.25	3.99	3.83	3.6	3.3	3.36	3.47	3.46	3.53	3.18	3.10	56.4	61.0	46.2	51.47
3	3.09	3.14	3.77	3.74	3.21	2.98	2.95	3.04	3.10	3.20	2.68	2.71	54.8	59.47	49.73	49.07

Group 1

On the self-regulated learning strategies scale, the sub-scale means of cognitive strategy use, metacognitive strategies and peer learning increased. However, the t-test analysis indicates that significance difference only exists between the pre-test mean and post-test mean of reading comprehension (2 tail sig. =. 000) and intrinsic goal orientation (2 tail sig. =. 001).

Group 2

Only variables in reading comprehension (2 tail sig. =. 035) and vocabulary (2 tail sig. =.026) showed significance difference.

Group 3

None of the variables showed significant difference except reading comprehension (2 tail sig. =.032).

7.3 Conclusion and Discussion

The following conclusions are drawn based on these findings:

7.3.1 There was no significant direct relationship between motivational variables with performance within the experimental groups. However, in terms of self-regulated learning strategies, there was no significant relationship with performance except in experimental group 2, where there is significant

relationship between metacognitive self-regulated learning strategies and peer learning with reading comprehension at the post-test.

7.3.2 Concerning the change in the motivational and self-regulated learning strategies subscale means, the t-test revealed a significant difference between the means on the intrinsic goal orientation scale (2 tailed sig.=.004) in experimental group 1.

7.3.3 In terms of performance, the t-test revealed a significant difference between the means of reading comprehension before and after the experiment either in experimental group or control group.

The results shown above might not be attributed to the manipulated independent Variable alone, in this case, the teaching of metacognitive strategies. The subjects (experimental and the control group) who were in the Upper Sixth form, would soon face the pressure of the National examination after the experimental teaching. The experiment ended in May 2001 and the examination would start in September in the same year. Therefore the students were assumed to be approaching the task with a focus on performance to obtain good grades. From the motivational issue, Pintrich and Schrauben (1992) identified two type of student's goal orientation, extrinsic and intrinsic goal orientation. Students with an intrinsic goal orientation to learning and mastery of course contents might be more willing to engage cognitively in deeper processing strategies such as metacognitive strategies. On the other hand, students with an extrinsic goal orientation are assumed to be approaching the task with a focus on performance to obtain good grades. The negative correlation between the reading comprehension and intrinsic goal orientation in group 1 at the post-test might be due to the influence of extrinsic goal orientation. Overall, the results indicates that both experimental groups and the control group were extrinsically motivated in using the

strategies taught to improve reading comprehension and finally to obtain good grades in the national examination.

Concerning the significant relationship between reading comprehension and metacognitive self-regulated learning strategies and peer learning in the experimental group 2 at the post-test, this group was particularly exposed to the group work environment where there were student-student and teacher-student interactions. Furthermore, the significant relationship between self-efficacy and peer learning might demonstrate that the group work conditions (co-operative learning) promotes students' self-efficacy and facilitate the use of cognitive strategies to enhance reading comprehension. On the other hand, Experimental group 1 was exposed to the work alone condition whereas the control group was in the traditional 'study and answer' conditions.

7.3.4 The relationship between motivation, learning strategies components and reading comprehension

The performance from the experiment were correlated with the motivational variables, the learning strategies and the resource management strategies particularly peer learning conditions to see the interplay of motivation and the use of metacognitive self-regulated learning strategies during the experiment. The stronger correlations between self-efficacy and metacognitive self-regulation strategies support the mediative role of self-efficacy in explaining the changes in learner's self-regulation and performance. These results were consistent with the meta-analysis, which revealed that student's motivation to learn is an important component to be considered in the model of how students come to use the different cognitive strategies and become self-regulated learners. In this investigation, students were taught on the use of cognitive and metacognitive strategies to help them enhance their reading

comprehension, there was no specific utilization of motivational variables in the instructional techniques. The meta-analysis had revealed that studies that utilize the cognitive and metacognitive strategies produced an effect size of 0.39, which is similar with the result of this experiment that was 0.36.

Despite the marginal changes in the motivational variables from time 1(pre-test) to time 2 (post-test), the instructional treatment seems to have some impact on these changes. The changes in the relationship particularly were stronger on the experimental group 2 than in the group 1. There seems to be a parallel increase in self-efficacy and metacognitive strategy use in both experimental groups. The results might imply the stronger correlations between self-efficacy and metacognitive self-regulation strategies and the mediative role of self-efficacy in explaining the changes in learner's self-regulation and performance. The instructional treatment might increase the self-efficacy of participants in experimental group. Thus, the results suggest that self-efficacy facilitated the use of the strategies, which are directly related to performance.

7.3.5 Verbalization and self-efficacy

Another possibility that might explain the increase in self-efficacy in both experimental groups is the use of verbalization in rephrasing not only the information read but also the strategies learned from the instructor. Rephrasing is a cognitive transformation activity, which leads to verbalization. According to Schunk (1985), verbalization is hypothesized to be an important means of increasing self-efficacy. Shunk (1985) noted that verbalization can direct children's attention to important task features, assist strategy encoding and retention and help children work in a systematic fashion. From this standpoint, verbalization can indirectly convey to students that

they are acquiring knowledge and skills. Knowledge that one has at one's disposal a method that can aid learning also conveys to the participant a sense of personal control over learning outcomes, which can enhance self-efficacy (Bandura, 1982a; Schunk, 1985).

The type of verbalization such as the one used in group 1 differed from student verbalization in group 2 where the students were involved in student-teacher verbal interaction, and student-student verbal interaction. The verbalization subject's in-group 1 first heard and observed the experimenter describe the model's action before attempting the strategies. The better performance in-group 1 might show that passive observation and verbalization to one's self-led to greater performance than socially communicated verbalization as employed in the experimental group 2. This study could be linked to a study by Coates and Hartup (1969) where the older children in passive observation performed better than younger children after being exposed to a filmed model performing novel action. Among the older children, free verbalization led to poorer performance.

7.3.6 Test Anxiety

All the motivational variables in the control group demonstrate positive non-significant positive relationship with comprehension compared to Group 1. The only difference demonstrated by the correlation was the higher anxiety level of the participants from the control group. The positive relations might suggest that, for this sample of students, test anxiety are related to retrieval problems at the time of testing rather than to lack of effective strategies for comprehension. This interpretation is in line with cognitive models of test anxiety (e.g. Benjamin, Mckeachie, & Lin, 1987; Tobias, 1985) that propose that for some test-anxious students who actually have

adequate cognitive skills, test anxiety during exams engenders worry about their capabilities that interferes with effective performance (Pintrich and Groot, 1990).

7.3.7 Instructions

In this investigation, elements of instruction were drawn from direct instruction, reciprocal teaching and generative model of learning. The experimental groups were given demonstration on the 'how' of learning and guided on the use of cognitive and metacognitive strategies to help them enhance their reading comprehension. The students were told that they should believe in their own ability and effort for academic success. The strategies taught would help them understand the text read and study for the coming national examination. Generally, the strategies taught were viewed as an aid to motivation and metacognitive awareness. According to Nist and Holschuh (2000), using effective learning strategies can create a sense of control over achievement, a sense of control may raise a students' sense of efficacy, which can lead to using more effective learning strategies. In this research, the use of cognitive and metacognitive strategies incorporating the component of motivation produced an effect size of d=0.36. In the meta-analysis, an effect size of d=0.77 was discovered with the strategies incorporating the affective components.

The results might have been affected by the duration of the treatment, because motivation is a complex element that is particularly difficult to change within such a short period of time. Furthermore, motivation was indirectly linked to students' cognitive engagement and academic performance. Academic performance depends on the ways that motivation and the use of learning strategies are influenced based on

the characteristics of the instructor, task and the class (Collins-Eaglin & Karabenick, 1994; Pokay and Blumenfeld, 1990- cited in Nist and Holschuh, 2000).

Finally, the findings from this study were consistent with the results found in the meta-analysis described in chapter 3. The meta-analysis had revealed that students' motivation to learn is an important component to be considered in the model of how students come to use the different cognitive strategies and become self-regulated learners. The effects of the treatment on performance were also explained in relation to the complex interplay of motivation, which was described as one of the influential variable in meta-analysis in enhancing the student's performance in reading comprehension. In terms of metacognitive self-regulated components, the correlations with performance were stronger in both experimental group 1 and 2 after the instructional treatment. The differences in performance in reading comprehension between the first and the second experimental group could be explained by the differences in the use of student verbalization in the instructional setting. Even though both metacognitive-self-regulation and verbalization are useful, it is crucial to consider time variables as an important element that influences the results of the students' performance in reading comprehension. Given more time for the acquisition and practice of the metacognitive strategies might increase the students' performance in reading comprehension.

CHAPTER EIGHT

Qualitative evidence: Results and Discussion

8.0 Introduction

This chapter will present a description of the qualitative data that will support the discussion of themes emerging from the written responses of the observational questionnaire given during the training. The purpose of the observational questionnaire was to examine the changes in the strategies used by the participants to enhance their reading comprehension as a result of the treatment. The second purpose was to examine students' reasons for using and not using the strategies taught during the treatment. Some of the questionnaire responses will be selected to further reveal participants' perspectives of strategy use in reading comprehension. However, the participant's identity will remain confidential.

Responses from the first training sessions and the last training sessions were analysed to see the changes in the pattern of strategies used by the participants. As already described, the participants were divided into two experimental groups and a control group. Both experimental groups received the instruction on the metacognitive strategies whereas the control group continued with their traditional strategies. The first experimental group received instruction on metacognitive strategies in a 'Work Alone' condition whereas the second group in a 'Group Work' condition. All the three groups were however given the same materials during the assessments sessions. The experimental groups and the control group were given the simple questionnaire on the strategies used immediately after answering the comprehension task during the training sessions. The number of questionnaires

returned by participants however varied from administration to administration. The questions posed to participants remained the same on all occasions.

8.1 Pre-reading strategies.

Prereading strategies help the readers to organize thoughts on the text's subject and plan for the reading task ahead. The strategies include noting the title or headings, organization of the text and general content, activation of prior knowledge and the presence of unfamiliar words or subject matter. In this study, only the hypothesis generation strategy and text organization were taught to the students. Analysing the responses to the questionnaire on the first training session helps the researcher to identify the participant's use and understanding of the concept of hypothesis generation and text organization. Hypothesis generation on the topic of the passage is expected to assist the readers to activate previous knowledge about the topic whereas knowing the text structure of the passage will give the readers the ideas of how the information is presented in the text. In other words, it will provide an organizational framework that assists readers in determining the relationship between ideas and details. Thus, text structure is another influence on reading that will partly account for how text is comprehended.

8.1.1 Responses to the first questionnaire following the first exercise

The response from the experimental group and the control group were almost similar following the first exercise. The most commonly stated pre-reading strategies from the three groups were 'Read the questions first', 'skimming' and 'read'.

'Read the questions first ' is the most popular response from the participants in the three groups. The rest of the participants reported skimming the passage before reading the passage once again to enhance understanding of the text. Only one

student from Group 1 reported using the knowledge of text structure to enhance understanding of the passage. Examples of statements from the experimental groups were translated from the questionnaires to show the pre-reading strategies in the early phase of the training.

In explaining the 'Read the question first' strategy, a student from Group 1 explained that

> *'Reading the question first before reading would help me to understand the passage faster and find the answers quickly'*

It is interesting to note that the second student from the same group did not use the term 'Read' the question but instead used the term' Understand' the question first before reading the passage. The student reported that

> *'Understanding the question first before reading the passage helped me to get the accurate answers.*

The above student also indicated an attempt to use the knowledge of text structure to locate the answers for the comprehension question when he/she stated that

> *Normally, the answer from question one is located in the first or second paragraph, followed by question 2 and so on…*

The third student from the same experimental group explained his/her flexibility in using the pre-reading strategies that he knew

'Firstly, it is important to read and understand the question. This is followed by reading the passage. If the passage is difficult to understand, try to give a fuller attention and generate hypothesis from our understanding of the previous knowledge

'

The above statements also implied the combination and flexibility of strategies used by the participant. It is also an attempt to use the *hypothesis generation strategy* as taught by the instructor. Finally, only one student from the experimental group 2

indicated the use of hypothesis generation strategy in the pre-reading strategies in combination with 'Read the question first' strategy;

'I read the question first to generate hypothesis on the contents of the comprehension passage'....

None of the participants in the control group indicated any use of the hypothesis generation strategy and text organization; instead the frequency of 'read the question first' and 'skimming' was high which indicated the students' use of pre-reading strategies in the reading task. Nineteen participants from the experimental group (9 from group 1 and 10 from group 2), and nineteen participants from the control group indicate using ' skimming' before reading the passage thoroughly. The reader might use skimming to get information about the organization of the text and general ideas on the content of the passage.

8.1.2 Responses to the questionnaires following the final training session (Fifth session)

The nature of responses between both the experimental group and the control group varies in the sense that both experimental groups attempted the pre-reading strategies taught such as *hypothesis generation and identifying the text structure* to assist understanding. For example, an experimental group student explained

> *I read the passage to get the whole idea and reread the passage to get the related ideas in the passage from each of the paragraph. The author always writes the main idea at the beginning of the first sentence in the paragraph.*

Another student from the same experimental group stated that,

> *By reading the text twice, I could relate the important points about the given topic whilst at the same time self-questioning myself about the passage. Well, sometimes I don't have the idea about what the writer is trying to say in the passage.*

The above student seems to activate his/her prior knowledge about the topic of the passage in an attempt to understand the given passage. From this statement, the students seem to use the hypothesis generation strategy where she/him tried to relate the important information she already knew about the topic with the given information she found from the text.

Finally, there are students who consciously indicate that knowing the structure of the text or by generating hypothesis helped to identify the location of the main ideas and details in the passage.

In explaining the advantage of knowing the text structure, the students reported

> *I read once or twice, then I referred to every paragraph because every paragraph of the passage certainly consists of the main idea in the first sentence followed by its details such as the main reasons for the problems discussed in the text, the strengths and weaknesses and how to overcome the problems.*

The above participant not only used the skimming strategy, but also at the same time trying to organize his/her thoughts for the reading task by noting the structure or organization of the text and its general content.

In another instance of hypothesis generation, the student clearly stated that

> *I read the passage carefully and underline the main ideas while generating the hypothesis.*

Other pre-reading strategies that emerge from the experimental groups include skimming, and reading the questions first. Most participants mentioned that skimming helps them to get the general idea from the passage and to relate the important details from the text to the main idea of the passage. One student from the experimental group indicates that

> *Skimming help me to understand the text. Then, I will formulate my own questions to extract the details of the text and making inference…*

To this student, skimming is the starting point to understand the text and even making inference or generating hypotheses regarding the details of the text. One of the students even said that skimming helps him/her to remember the important information related to the text. The same student said that the strategy would help him/her to understand the passage. This strategy is by far, the most commonly stated strategies before using the other strategies taught during the treatment. Most participants indicate using these strategies to get the general idea of the passage, to identify the structure of the text and even to generate hypothesis regarding the details of the text. This strategy was however not taught during the treatment because the strategy was commonly known by the participants and taught by the language teachers in the junior high school.

Other participants still read the questions first before reading. These students stated the reasons for using the strategy;

> *I read the questions first and next, I will try to find the answers from the passage. This would enable me to understand the text and at the same time, trying to answer the questions on comprehension.*

Another student from the experimental group explained that he/she just read the question first before reading the text because;

> *Using this strategy would enable me to understand the contents of the text and knowing what the questions want before rereading the passage for the second time.*

Responses from the students in the control group did not vary from the first training session. The participants were mostly discussing the fastest way to get the main points and answering the comprehension test as accurate as possible;

A participant from the control group described;

I skimmed the text, and analysed the questions given before looking for the main ideas. This strategy will help me not only to retain the most important information from the text but also to answer accurately.

Some participants described analysing the questions before skimming and underlining the answers for the comprehension test. Other participants from the control groups did not indicate using the pre-reading strategies other than *looking for main ideas and reading*. One participant from the control group reported;

> *Just read and pay more attention to the important details in the text.*

Generally, the responses from the participants in the control group were mainly about the test-taking strategy with the main purpose of looking for the accurate answers. Similarly, the participants in the experimental group who responded with 'read the question first' were also concerned with the test taking strategies but with the purposes of improving their understanding and to retain the information given in the text in addition to answering the accurate answers.

8.2 Strategies used while reading

The overriding strategies emerged from the participants responses includes *reading, rereading, looking for main ideas and questioning.* The strategies taught during the training session was *questioning and verbalizing*. The participants from the experimental group were expected to use more of this strategy compared to the control group. Other strategies used by participants will also be examined based on the questionnaire administration on the first and the last training session conducted during the treatment.

8.2.1 Responses to the first questionnaire following the first training session or first exercise

Only four participants from the experimental group indicated using the questioning strategies and verbalization in their attempt to understand the passage. The responses

from the experimental group and the control group mostly fell into the 'just read' and 'rereading' category. The pools of responses between the two groups were largely the same. One of the participants in the control group said, 'I *read the passage until I could grasp the concepts or main ideas in the passage, if I really couldn't understand, then I'll read the given questions* '. Most of the participants listed down the steps used while reading the passage, another participant from the control group listed down the steps as follows;

- *Read carefully and try to understand the facts or sequences of events in the text*
- *Reread the text if I was not sure*
- *Then, read the questions given and try to obtain the answers from the passage*

A participant from the experimental group stated that *'I read the text Repeatedly to not only understand but also to infer the meanings written in the text. This strategy helps me to generate ideas and stimulate my thinking while answering the comprehension questions.*' Other participants from the experimental group used other strategies such as underlining in combination with read and rereading strategy. Another participant from the experimental group explained,

'Rereading and underlining the important ideas helps me to understand the text, however, I read the question first during the test, due to the time constraint'.

From the above statement, this student seems to be aware and distinguish the test taking strategy and the strategy used for comprehension.

In addition, this gives the indication that the participants already have their own strategies for comprehending the text. However, none of the participants from the control group indicates the use of 'question generation' or 'self-questioning' strategies in the first training session exercise.

One of the participants in the experimental group described the attempt to use the questioning strategies, *'I read the passage and underlined the main ideas before I generate more questions from the main ideas'.* Another participant explained, '*I generate the question while reading, at the same time, I underlined the important points to understand the passage '.*

As indicated in the responses by the participants, more than a single strategy was usually used in the comprehension of text. Some participants indicated the use of *underlining* and *looking for main ideas* while *reading and rereading*, while others were using *visualization and verbalization.* One of the participants from the experimental group demonstrated the use of various strategies, *'Read the passage carefully while at the same time looking for the main ideas, then reread the passage if I still could not understand the paragraph. I usually used visualization or verbalization because they are effective for me. In answering the comprehension test, I search for the answers from each of the paragraphs; usually the first question is from the earlier paragraph'.*

Another experimental participant from group 2 described how verbalization helped in reading and understanding the text;

> *Firstly, hypothesis generation gives me the general idea of the main topic discussed in the text while Verbalizing enabled me to give more attention while reading.*

Most participants however did not explain how they were using the strategies. Finally, other participants from group 2 (Group task) described verbalizing strategies in groups as a hindrance and disturbing, one participant from group 2 responded;

> *Verbalizing could be very disturbing, I preferred reading internally (covertly).*

Eight participants from group 2 described verbalizing as a distraction and unable to concentrate while reading. Another nine participants simply said that verbalizing was a waste of time.

8.2.3 Responses to the questionnaires following the final training session (Fifth session)

Responses from the experimental groups varied from *'read' only to 'question generation' 'rereading'* and verbalizing strategies whereas the control group favoured the *read and underlining strategies* as used in the previous session. *Read only* continues to be the common strategies in both the experimental and the control group. Most participants in the control group simply stated down their use of strategies as;

'Read - find the important points -understand the passage' or

'Read – understand – writing down notes – remember '

'Read carefully –underlined the important points – understand – answer the questions'

'Read each of the paragraphs carefully – find the most important points – write conclusions'

The steps listed above indicated their attempt to understand and answer the questions from the passage. One of the participants from the control group denied using any strategies at all and noted his/her weaknesses for not being able to concentrate or paid attention while reading the text. The participant was aware his/her own weaknesses and even suggested underlining as a strategy to improve reading comprehension. None of the participants in the control group indicates any use of the question generation or self-questioning strategies while reading.

The responses differed from the experimental groups who allowed themselves the freedom to use their own strategies beside the strategies instructed in the training session. For example, most of the steps or strategies used to understand the text were as follows;

'Read the passage – generate your own questions to further understand the passage – reread the passage to obtain your own questions '.

'Read –generate questions- finding the answers from the questions enabled me to understand the passage clearly'

'Skimmed the passage – generate questions to extract the main ideas from the passage.

'Read-generate questions-find the answers from the passage-discussed with teachers and friends if I find difficulties in understanding'.

As demonstrated in the above examples, most experimental group participants understood the use of *question generation* as one of the strategies not only to extract the main ideas but also to understand the passage clearly. Analysis from the questionnaire responses indicates improvement in the number of participants from only *four to nine* participants using the strategies beside strategies such as rereading and underlining while reading the passage. The number of participants using the read the question first declined from *nineteen to only three.* Most participants might understand the use of the strategies in studying and in the comprehension of text and distinguish the use of strategies during the test. One of the experimental group participants explained that the use of questioning not only helps in the understanding of the passage but also to remember the information read from the passage. Some participants even suggested more training on the use of the strategies taught or suggested other strategies such as *rereading and underlining.*

With regards to verbalization, the responses remain the same. Four participants thought that verbalization was useful depending on the materials used. In other words, these might imply that text difficulty might affect the strategy used. Most participants from group 2 (Group task) described verbalizing strategies (overtly) in groups as a hindrance to their concentration and taken most of their time while they could just read silently to understand the passage. One participant described that verbalization could be effective depending on the type of text. The participant responded;

> *Verbalizations are useful for informative text or text that needed further interpretation from the learners.*

In respond to the same question, the second participant from the same group stated that;

> *I needed verbalization for the understanding of certain main ideas discussed in the passage.*

Comparatively speaking, the experimental groups indicated more use of the strategies taught such as *question generation, looking for the main ideas and the elaboration or supporting* details and were able to describe the use of strategies using the terms such as question generation and hypothesis generation in the questionnaire. Most participants in the control group repeatedly using the terms such *as read, read repeatedly or read once to obtain general ideas, try to find the important points or writing down the important points beside the passage in each of the paragraph etc.* These indicate their difficulties in search of the appropriate terms to describe their strategy use.

8.3 Post- reading strategies

Strategies such as summarization and paraphrasing which leads to verbalization of their strategies and their understanding were categorized as the post reading strategies.

In the *'work alone'* condition, the participants were not able to socially communicate their ideas or the strategy used to their peers as compared to the participants in experimental group 2. The participants were told to work individually using the strategies explicitly instructed during the training session. The use of these strategies in the experimental group was monitored from the questionnaires administered after each training session. The participants' understanding of the passage and the strategy use were demonstrated from what they had written in the questionnaire and self-description of the strategy used. The questionnaire provided a column for the participants to paraphrase the passage and the strategy used.

8.3.1 Responses to the first questionnaire following the first training session or first exercise

Following the first training session, the number of the participants from the experimental group 1 and control group using summarization/paraphrasing and verbalization was largely the same. However, the responses from the control group participants indicate that they were unaware of summarization/paraphrasing and verbalization as strategies. Most participants summarize the contents or major ideas in the passage, when asked about strategy used to understand the text, the control group participant stated that, '*I just read and paid more attention to the important points and tried to remember the information for the coming test.* Another participant from the control group who had written an excellent summary on the passage, not realizing that it was one of the strategies for monitoring comprehension said that, *' I tried to find out the main topic of the passage and underlined the important points'.* Other example of strategy used by the participants were, ' *I read and tried to infer the message I've read from the passage'*. This participant has also written a summary on the passage'. These are example of statements from the control group indicated that

they are unaware of summarization/paraphrasing and verbalization as strategies and was limited in finding the right term to explain the strategies used to understand the passage. On the other hand, the responses emerged from the experimental group reflects the strategies taught during the training session. An experimental participant listed down the strategies used as follows;

> *'I read repeatedly. During the first reading, I tried to understand the passage before generating the questions related to the passage. The main ideas were obtained from answering the questions generated earlier. In this way, it's easier to get the important ideas for summarizing and differencing'.*

In addition to the description of the above strategies, the participant had written down a summary, paraphrased from the passage. The above example was taken from experimental group 1. All the participants in this group had written their summary, paraphrased from the passage indicated their use of the strategy. One participant from the experimental group gave the reasons for paraphrasing or summarizing the passage that, '*this strategy will not only help me to understand the passage but also to retain the information that I've read'*. The other participant explained that,*'writing down the main ideas and trying to infer in my thoughts will not only help me to understand more but also to find the right answers for the questions'.* This participant used the phrase '*infer in my thoughts'* when trying to describe verbalization.

The participants in experimental group 2 were told to summarize/paraphrase the contents of the passage to their peers in a group or to socially verbalize and communicate the strategies used. Different pattern of responses emerged from this group regarding summarization/paraphrasing and verbalization. With respect to

summarizing and paraphrasing the passage in their own words, not enough information was obtained from this experimental group. Most participants indicated that they had not enough time to write down the summary written in their own words in the questionnaire given. However, one participant had written positive statement about summary or paraphrasing;

> *Writing down the contents of the passage in my own words enabled me to understand the passage and helped me to retain the information written in the text. However, I'm not used to verbalizing (out aloud)...*

Other participants from experimental group 2 had given negative response to verbalization. For example, one participant indicates that; '*verbalizing is a waste of time, I could not pay any attention or retain any information from verbalizing the information aloud'.*

Other participants expressed their preference for individual work task suggesting that verbalization was a waste of time and could cause distraction and lack of concentration.

8.3.2 Responses to the questionnaires following the final training session (Fifth session)

In the final training session, most participants from the experimental groups were able to paraphrase the main ideas obtained from the passage in their own words. Seven participants from experimental group 1 and thirteen from group 2 paraphrased the main ideas from the passage. The rest of the participants from experimental participants either listed down the main ideas or written down the main topic of the passage in the column given in the questionnaire. The response from the control group remains the same. Majority of the participants listed down the main ideas as found in the passage or written down the main topic of the passage. Two participants

from the control group attempted to summarize the main ideas from the passage in their own words.

With regards to verbalization, the responses remained the same. Few participants from the experimental group indicated the positive use of verbalization;

> *Verbalizing out the information is effective for the understanding of the passage.*

Another experimental participant indicated the use of verbalization depending on the text given;

> *Some of the contents in the passage needed clarification and additional information and verbalizing are required for this kind of passage.*

Finally, another experimental participant stated that;

Verbalization is required for sections of the text that needed reinterpretation.

Other response from the experimental group remained the same, most participants from the experimental group indicated that verbalizing had taken a lot of their time. A participant from the experimental group written;

> *Verbalizing the strategy is taking a lot of time compared to summarizing or paraphrasing.*

Other negative statements from the experimental groups include;

Verbalizing would confuse me more...

I tried to verbalize, but this could affect my answers to the comprehension exercise……..

Verbalizing is difficult for me; I'm used to reading in my head...

Most participants from the experimental group, particularly group 2 did not favour using verbalization (overtly in group), which had been thought as a time taking strategy. The responses might demonstrate the participants improved awareness of

summarizing and rephrasing as strategies for deeper understanding of the text or monitor comprehension.

8.4 Summary

The questionnaire indicates a mild improvement in strategy use among the experimental groups. The experimental group showed greater improvement over the control groups, not only in the use of the strategies taught during the training session, but were able to use the strategies flexibly with other strategies such as *skimming, rereading, underlining and summarizing/paraphrasing*. Strategies such as generating questions or self-questioning and summarization/paraphrasing were found to be increasingly reported by the experimental groups while the control group participants were repeatedly using the *test taking strategy such as read the questions first*, underlining, and *looking for main ideas and rereading.*

Even though the participants from the experimental group, particularly group 2 did not favour using verbalization (overtly in group), deemed as a time consuming strategy by most of the participants, these responses might indicated awareness of the flexible use of strategies for comprehension. Some participants (about 13.3% from experimental group 2) even indicated the use of verbalization (aloud) if there is a need for clarification on certain sections of the passage given. Some experimental groups favoured the use of questioning (about 15%), summarizing/paraphrasing and verbalizing covertly (about 33.3%) as indicated in previous section on example of statements from the participants regarding verbalization. Furthermore, the response might differ depending on each of the learners learning style and learning environment such as revising and studying for examination.

Finally, the continuous use of the test taking strategies and read only strategies by some of the experimental group participants also implied participants' misunderstanding of the term 'strategy' for comprehension as taught during the training session. These might have resulted from inadequate time allocated for guided practice to ensure better understanding of the strategies used and when the specific strategies could be used. The instruction included guided practice and the modelling given was not sufficient for the experimental group participants to recognize the helpfulness of using the strategies taught. Given more training on the use of strategies such as hypotheses generation might even assist the students in comprehending the text even during the examination where the time limitation is given for reading the text. Adequate time for instruction and training on strategies to be used should improve not only the scores on reading comprehension but also the clarity of responses on the questionnaires.

CHAPTER NINE

Teachers and students' opinion

9.0 Introduction

Reactions from the students involved in the study towards the instructional program during the treatment were measured by the questionnaire response distributed two days after the treatment. The teachers' were interviewed to provide a critical and discerning feedback on the investigation.

9.1 Questionnaire responses

9.1.1 Students' opinion

Participants in the experimental group were asked if what they've learned will help them to study and understand the text or any other reading materials given in the future. Generally, the students' reaction was positive. More than three quarters of the subjects agreed (76.6%) that the strategies that they had learnt from the instructional program would assist them to study and understand the text. Almost a quarter of the participants thought otherwise (5%), unsure (3.3%) or did not response (15%) at all to the question. This might be attributed to the fact that the participants did not have clear ideas about the strategies taught during the treatment due to insufficient time for guided practice during the training.

Table 56

Frequency and percentage of the experimental participants reaction that what they have learned will help them to study and understand the text or other reading materials

	Yes	*No*	*Unsure*	*No response*	*Total*
Frequency	*46*	*3*	*2*	*9*	*60*
Percentage	*76.6*	*5*	*3.3*	*15*	*100*

About 53.3% of the experimental participants reported that the learning of the four strategies were easy and the rest of the participants either thought that the experience of learning the strategies was confusing but managed to understand (16.7%), or too difficult (5%) and another 25% did not response at all. The experimental participants who found it too difficult and did not respond at all accounted for almost one third of the experimental participants. Most participants did not give the reasons why they found it difficult or confusing. However, most participants who thought that the strategies were easy to learn stated that the strategies were taught systematically and this had helped them to understand the text. Two participants mentioned the use of strategies before the treatment, but were not aware of the term 'metacognitive strategies' and the uses were rather unsystematic.

Table 57

Frequency and percentage of the experimental participants reaction to whether the learning of the strategies taught were easy, confusing, but managed to understand or difficult

	Easy	*Confusing, but managed to understand*	*Too difficult*	*No response*	*Total*
Frequency	*32*	*10*	*3*	*15*	*60*
Percentage	*53.33*	*16.7*	*5*	*25*	*100*

When asked about which metacognitive strategies they had most difficult with, twenty participants (33.3%) thought that hypothesis generation was the most difficult strategies, followed by verbalization (26.6%), summarizing (13.3%) and

question generation (6.6%). Twelve participants (20%) did not give any response to this item.

Table 58

Frequency and percentage of the metacognitive strategies that the students found most difficult with.

	Generating hypothesis	*Generating questions/questioning*	*Summarizing*	*Verbalizing*	*No response*	*Total*
Frequency	*20*	*4*	*8*	*16*	*12*	*60*
Percentage	*33.3*	*6.6*	*13.3*	*26.6*	*20*	*100*

The participants were asked about what they would tell if someone asked about they've learned from using the metacognitive strategies. Fifteen of the experimental participants (25%) would tell that the strategies taught helps them to *understand*, whereas 16.7% would say that the strategies could help them to enhance their *learning and studying*, 8.3% stated that they 've learnt about the use of metacognitive strategies and another 8.3% said that the strategies would help them to think and retain information. The rest of the participants wrote various kinds of response to this item such as, '*a new practical approach ' of learning, ' the use of strategies to boost confidence in learning'*. These statements were categorised in 'others'. The remaining 26.7% of the students did not give any response to this question. The percentage of positive response (more than 70%-with the exception of 'No response' column in the table below) to this question remains the same as the first question posed to the experimental participants. However, this item had given the experimental participants the opportunity to write other learning experiences they have gained from the strategies taught.

Table 59

Frequency and percentage of what the participants have learned from using the metacognitive strategies

	Helps to understand	*Enhance learning and studying*	*The use of metacognitive strategies*	*Think and retain information*	*Others (promote the use, a new approach, good strategies, confidence)*	*No response*	*Total*
Frequency	*15*	*10*	*5*	*5*	*9*	*16*	*60*
Percentage	*25*	*16.7*	*8.3*	*8.3*	*15*	*26.7*	*100*

The participants were asked to tick as many options as they want to describe the way they felt about learning the metacognitive strategies. Only 8.3% of the participants felt that the strategies were specifically *useful for understanding and finding the main ideas*. Most of the experimental participants (41.7%) felt that metacognitive strategies are not only *useful for studying, but also for understanding and finding the main ideas and remember information*. This is followed by 23.3% of the experimental participants who felt that they rather memorize the information for the examination. The remaining 26.6% of the experimental participants did not respond to this question.

Table 60

Frequency and percentage on students' opinion on the way they felt about learning the metacognitive strategies

Students Opinions	***Frequency***	***Percentage***
i. A useful strategy for studying. ii. Useful to understand and find main ideas iii. Useful to remember information	*25*	*41.6*
iv. Rather memorize the information for the examination	*14*	*23.3*
ii. Useful to understand and find main ideas	*5*	*8.3*
No response	*16*	*26.6*
Total	*60*	*100*

When asked about their confidence and motivation on using the strategies to study for National examination, more than half of the participants (56.7%) felt confidence and motivated regarding using the strategies taught for the national examination in the sixth form. This is followed by 16.7% of the experimental participants who were not

confident, 6.7% (unsure) and the remaining 20% of 'no response' to the given question.

Table 61

Frequency and percentage of students reaction regarding confidence and motivation on using the strategies to study for the coming National Examinations in the sixth form

	Yes	*No*	*Unsure*	*No response*	*Total*
Frequency	*34*	*10*	*4*	*12*	*60*
Percentage	*56.7*	*16.7*	*6.7*	*20*	*100*

9.1.2 Teachers' opinion

Only two classroom teachers were involved in the training of metacognitive instruction to the experimental participants. When asked about the feasibility and usefulness of the metacognitive strategies for the age and ability level of the readers, the teachers agreed that the strategies were effective for the participants at this age level. The teachers also expressed confidence in using the suggested strategies in future, especially *paraphrasing and questioning.* Before this, the teacher was only using the *underlining and looking for main ideas. Most importantly,* the teachers indicated that the strategies taught benefited the weaker students to understand the text that they were studying, which was thought to be more appropriate than the 'memorizing' strategies that they are used to. In addition, the strategies could even benefit the very good students to think and understand more efficiently. Generally, when asked about the results of the investigation, the teachers indicates that the very good students maintained their grades, and the students who never seems to use any strategies before had demonstrated their awareness and used the strategies taught during the training session. On the other hand, the teacher who taught the experimental participants in the 'group-worked' situation indicated that the students were more confident in expressing opinion. The students were also thought to be more willing to share information not only within the group, but also with the other

group members in the classroom. The teachers further explained that the students were not used to learning in groups and were used to the individual learning culture where the students were not involved in student-student interaction

When asked about the materials used, before, during the training and after the treatment, both teachers agreed that the materials used and the difficulty level were aptly selected not only for the strategies taught but were also appropriate for the National Examination for the sixth form students. Both teachers involved pointed out that most topics of the chosen passages were out with their background knowledge. The results from the students responses indicated that this was the main reason for why most participants had found hypothesis generation strategy as the most difficult of all the other strategies taught.

In fact, interest in obtaining copies of the materials was shown by the school principal and other teachers of the General studies Department. Finally, photocopies were made available to the other students in the sixth form who were not involved in the experiment.

9.2 Summary

Students' opinion toward the strategies taught was determined from the questionnaire responses. Most students (about 76.6%) were positive towards the learning of the strategies taught during the treatment and felt that the strategies would help them to study and understand the text or reading materials in the future. However, most students thought that *hypothesis generation strategy* was the most difficult followed by verbalization (overtly-socially). This might be due to the materials used as realistically pointed out by the teachers where most topics of the chosen passages were out with their background knowledge. However, more than half of the

experimental participants expressed confidence and motivation to use the strategies for studying and preparation in the coming national examination. Overall, the teachers' and students' opinion towards strategy use were positive as reflected from their comments and responses from the questionnaire .

CHAPTER TEN

Conclusion, Discussion and Implication

10.0 Introduction

This chapter starts with a brief overview of results and variables identified from the meta-analysis before the results were compared with the results obtained from the empirical study. The conclusions were discussed in light of these evidences or comparison which will gives further insights and understanding concerning the effects of metacognitive strategies on reading comprehension. Finally, the chapter ends with a section on the implications for educational instruction and research.

10.2 Brief overview of result and variables from Meta-analysis

The meta-analytic study conducted earlier in this thesis provided the need for an empirical investigation regarding the effects of metacognitive strategies on reading comprehension. It was the meta-analysis that had pointed out what the important variables were to be considered for the replication. The understanding of the effects of these variables on the treatment results are crucial before any findings would become substantially secure to be a safe basis for general conclusions.

The meta-analysis had identified the following variables as affecting the treatment results;

- The methods of assignment to experimental and control groups

  Stringent d=0.71, Less stringent=0.55

- Sample size;

  1-45 (0.80), 46-100 d=0.48, >100 d=0.60

- Type of instructions;

  The use of self-instruction plus verbalization demonstrates a large effect size of d=1.02 compared to reciprocal teaching (instruction emphasizing social and verbal interaction) that was d=0.67 and generative learning plus the use of motivation where the effect size was d=0.76.

- Grade level and ability;

  Most research effort in metacognitive reading strategy instruction covered the Low ability and primary or elementary level students from Grade 4-12, and adult Low ability readers in college. More independent studies should be designed on the above average and average adult population or the mix ability group in college to draw conclusions on the efficacy of the metacognitive strategies for these populations. It is unlikely that all the average students or the mix ability group are aware or conscious of the effective reading strategies to monitor their learning and understanding.

- Time for the treatment (duration in days or number of sessions);

  The meta-analysis had suggested that more training or session should be conducted with the population. According to the meta-analysis, treatment conducted more than 10 sessions or a longer period of time (more than 25

days) would have a large treatment effect (d=0.61). A longer period of time may be necessary for measurable growth in reading comprehension to be made.

- The number of strategies taught;

  The results of studies employing more than one strategy such as those in generative and reciprocal teaching had a mean average effect size of d=0.76 and d=0.67 compared to the use of a single strategy such as questioning that produced an effect size of d=0.35.

- The instructors;

  The results suggested an effect size of d=0.64 if the instructions of the strategies were conducted by the researchers and d=0.49 if the instructions were carried out by the research assistance. Inevitably, different instructors have different impact on the experiments or instruction carried out.

Based on the above research recommendation from the meta-analysis, the empirical investigation was carried out. The results from the empirical study were compared with the results from the meta-analysis to provide a better insight on the various patterns of findings and complex features that might contribute to the confusion across previous studies.

10.3 Comparison of results from the experiment and meta-analysis using Effect size

Table 62
Comparison of results from the experiment and meta-analysis using Effect size

Variables	**Features of the empirical investigation**	**ES (d) from Meta-analysis**
Effect size (d) of: Reading comprehension Vocabulary	 0.36 (Group 1 :work alone) 0.05 (Group 2: Group work) -0.49 (Group 1: work alone) -0.03 (Group 2: Group work)	*0.58 (overall estimate)
Research design/publication type	-The pre and post-test control group design -random assignment (equivalent group-not matched according to ability)	*0.55 (less stringent method of assignment) * 0.44 (Thesis)
Sample size	30 in each group	*0.43
Cognitive and metacognitive strategies (with affective components)	Hypothesis generation, Questioning, summarizing (paraphrasing), verbalization	*0.50
Model of instruction	Direct instruction, reciprocal (social and verbal interaction) generative learning	*Direct instruction=0.44 Generative learning=0.76 Reciprocal teaching=0.67 Self-instruction and verbalization=1.02
Grade level	Sixth form (equivalent to college level)	0.72
Ability	Average	*0.37
Time/Number of session	Five	0.60
Number of strategies	Five	0.59
Instructors	Teachers	*0.56
Materials used	Combination (Narrative and expository)	*0.49
Tests used	Experimenter developed tests	0.60

* *Indicates similarity of results* from the meta-analysis

The above table clearly indicates that the results from the meta-analysis such as *sample size, ability grouping*, and the instructional variables such as the *strategies and materials used* during the experiment were similar with the findings from the meta-analysis. These variables were reported to be significantly associated with the variation in effect sizes in the meta-analysis.

10.3.1 The following justification and conclusions could be drawn from the comparison:

- **The research design**; even though the participants in this experiment were pooled and randomly assigned to three different equivalent groups, the students were not matched according to the reading and learning ability. Matching might have increase the sensitivity of the statistical test.

- **The grade level and ability group;** - According to the results from the meta-analysis, the treatment would equally benefit the 'Mixed ability group' (*d=0.69, Q_w=14.94, K=15)* , low ability group (*d=0.57, Q_w=18.73 K=11)* and the average group *(d=0.37, Qw=17.5)*. The results shown no significant difference between the effect sizes, but however there was an indication that the effect sizes increased depending on the students' ability. The meta-analylsis had also indicated that the strategies would equally benefit both students from the younger group at grade level 2-3 and the older students at the college level. The effect sizes were 0.69 and 0.72. In this study, an experiment using the average group revealed an effect size of 0.36, similar to the finding from the meta-analysis. The results implied that the metacognitive strategies benefited the the Mixed ability or low ability group more than the average or the high ability group.

- **Number of strategies;** Even though a multiple number of strategies were used in this experiment, insufficient time and guided practice had limited the participants to develop and internalise strategies taught over five training session. Improved strategy use might have led to better performance in reading scores.

- **Motivation;** The instructional procedures were based on direct instruction, reciprocal teaching and generative learning. In generative learning, one of the most important elements was to teach the students that success in schools begins with a belief in themselves, their ability and effort and the strategies will enable them to control outcomes. In reality, motivation is a complex element that is particularly difficult to change in young adult readers within such a short period of time. More time would be needed for the integration of motivational approach in learning. In this study, cooperative learning in 'group work condition' exposed to experimental group 2 might explain the significant relationship between self-regulated learning strategies and peer learning with performance in reading comprehension at the post-test. The significant relationship between Peer learning and self-efficacy might indicated that cooperative learning promoted the students' self-efficacy and therefore the use of cognitive learning strategies. Previous study by Johnson and Johnson (cited in Topping, 1988) comparing the effects of co-operative, competitive and individualistic learning experiences on handicapped and non-handicapped pupils revealed that cooperative learning promoted higher self-esteem and greater empathy on the part of all the children. Cooperative learning promoted greater verbal interaction and physical closeness that towards the end of the experience, the handicapped children had lower self-esteem on average than the non-handicapped children, but was much less than so for those who had been members of the co-operative' group (Topping, 1988).

- **Verbalization;** The use of verbalization strategy as identified from the meta-analysis produced a large effect size of d=1.02. In the experimental setting, the differences in the use of student verbalization in the instructional setting could be the reason for difference in performances in reading comprehension test data between the first and the second group. In this investigation, the better performance in group 1 might show that passive observation and verbalization to oneself led to greater performance than socially communicated verbalization as employed in the experimental group 2. Responses from the qualitative data showed that the experimental participants in group 2 were aware that overt verbalization was *time consuming and a distraction.* According to Schunk (1986), verbalization helps to *focus* students' attention on important tasks features rather than on irrelevant information, if children do not focus their verbalizations on relevant material, no amount of self-talk will lead to skill acquisition (Schunk, 1982). In addition, *verbalization* is an additional task, it even could hinder performance if it interfered with children attending to and processing information relevant to the primary task (Denney, 1975). With such theoretical explanation from Schunk (1986) and Denney (1975), the *covert verbalization in a work alone environment* might helps the students to focus their attention on the reading task using the strategies taught in group 1. As a form of rehearsal, verbalization assist not only in the coding and retention of information, but also assist monitoring, as when the students who are reading material to be comprehended periodically stop and attempt to summarize what they have read. In group 2, *overt verbalization* during the strategies instruction could be

a distraction to the student's attention and might lead to poorer performance in reading comprehension.

10.4 Limitation and Recommendation

Instructions progressed for five number of session within six weeks period for 80 minutes a day in the use of metacognitive strategies given (hypotheses generation, question generation, summarization/paraphrasing) plus verbalization as given by the sixth form teachers from the school. Given the multiple numbers of strategies, the time given was insufficient for the participants to develop the strategies. This study suffered, in the researcher's judgement, from inadequate time allocated for guided practice. With adequate guided practice, the participants would gain *confidence* in using the strategies and recognize the reading situations that *dictate the use of specific* strategies. Furthermore, the bureaucratic procedures and the technical problems as described in the correspondence section limited the length of the instruction, supposed to be 12 sessions in 12 weeks was shortened to only 5 sessions within six weeks. In the meta-analysis, either studies conducted less than 15 days or 15-25 days and more than 25 days produced an equally moderate effect sizes of d=0.49, d=0.47, d=0.61, and d=0.78. For studies conducting in between 1-5 sessions, 6-10 sessions and more than 10 sessions, the effect size were equally moderate d=0.63, d=0.65 and d=0.40. With these results, the issues surrounding the instructional time remain unresolved. Due to the varied times for instruction, metacognitive components, instructional procedures, and types of measures, it is difficult to determine an optimal time to allocate for instruction. Shorter interventions might not include maintenance measures. Additionally, the 4-day study (Chan et al., cited in Collins et al, 1995) did not benefit diverse students when scaffolded materials were faded, leading Chan et

al.(cited in Collins et all, 1995) to conclude that, for diverse learners, scaffolding must be faded slowly and adequate time and practice must be provided for diverse students to master strategies. Rottman and Cross (cited in Collins, 1995) incorporated 5 weeks of instruction, but attempted to teach five strategies during that time. Because of weak effects for reading comprehension, they concluded that they taught too many strategies in too short a time and that it would be better to teach fewer strategies and devote more instructional time to each. Considering the students' ability level, i.e. the average group and the multiple number of strategies during the treatment, perhaps, extended guided practice, distributed within the time given for the research would improve the reading strategies used that might lead to better scores in reading comprehension. Ample time may be required for the students to experience sufficient modelling, guided practice in a variety of texts, and systematic feedback in order to develop metacognition and independent strategy use. Further research or replication is required to more clearly define "ample time."

As described, participants' strength and weaknesses should be considered before the instructions on the multiple numbers of strategies. In future, the researchers might consider narrowing down the number of strategies or teaching just one strategy at a time until the strategy is mastered after considering the participants' circumstances. Considering the time constraints for the investigation, the number of strategies taught should be narrowed down.

Even though the teachers indicated in the interview that most of the chosen passages aptly suited the sixth form participants, the student knowledge factors such as the *amount and organization of prior knowledge* were not assessed. Background knowledge is related to the student academic performance and potentially related to the use of *Hypotheses generation* strategies as taught during the training. This

strategy emphasized on the activation of *prior knowledge* or experience related to the topic. Lack of participants' background knowledge might result in difficulties of using some of the strategies during the training session.

There is another important issue that need to be addressed by the future researchers. Assessing the motivation from the comprehension tests scores and answering the self-report instruments thoughtfully are *less tangible*. Such evidences are not easily discerned from self-reports. Self-reports can only be used effectively to measure *student perceptions of motivation and cognitive engagement* (e. Ames & Archer, 1988; Meece et al., 1988). In this research, the findings from the qualitative data (structured interviews and observational questionnaire) had helped to explain the difference in comprehension test scores and the impact of instructional treatment on motivation. Researchers in the future should be mindful of the measures used depending on the participants' age.

This research was partly based on Wittrock's theory of learning, "The generative learning model". His model emphasized on the use of variety of methods including those that were part of the research treatment. Motivation was one of the important features in Wittrock's generative model of learning. In this investigation there was no specific use of motivational approach in metacognitive instructions because the researcher had hypothesized earlier that the instructional treatment would have an impact on the participants' motivation. It is suggested that a full model of generative model of learning's methods should be replicated. This method provides a flexible approach for a variety of readers and the flexibility is of great value to participants at the college level or the sixth form college.

Finally, there is a need for a further replication of the study concerning the impact of metacognitive strategies on reading comprehension. The findings from any

singly study might be too dependent on the particular sample and methodology used, and therefore not a secure basis to make general conclusions.

10.5 The Implication

- The meta-analysis conducted earlier in this research yielded many findings that had given lots of thought and directions for the researcher to identify the important variables considered for the experiment. The analysis of evidence from the results of meta-analysis and the experimental research demonstrated the need for a mutual support between the qualitative work and quantitative work. Fitz-Gibbon (1985) wrote, "Another instance of mutual support between qualitative and quantitative work occurs when quantitative analyses support experiential evidence".

- Effect size was used as the simple index to represent an estimate of the value of a treatment. The obtained effect size estimate of d=0.36 from the experiment suggested that on average students using the metacognitive strategies did better than 64% of those students in the control group.

- The experiment has proven that metacognitve strategies plus verbalization were also useful for the 'Average' group from the sixth form (equivalent to college level). However, the comparison of results from the meta-analysis had given the evidence that the strategies would be more effective with the 'Low ability group'.

- The theoretical literature and meta-analysis had given the most convincing evidence and predictions regarding the effects of

metacognitive strategies on reading comprehension. However, the experimental study provides more concrete evidence from quantitative and qualitative diversity. In other words, the research was a move from theory into practice.

- Verbalization was as an additional cognitive (rehearsal) strategy to the metacognitive strategies in this research. The qualitative responses provided the evidence that socially communicated verbalization (overt verbalization) could be a distraction to some participants whereas covert verbalization (verbalization to one's self) had proven to be useful to the participant and may facilitate the participant's performance in reading comprehension. These results might show that passive observation and verbalization to one's self-led to greater performance when used with older children.
- The Correlational analysis indicates no direct relationship between motivational variables and performance. But, there is an indication of facilitative role of self-efficacy in the cognitive and metacognitive strategy use.
- A longer period of time for practice is recommended. Increased time for guidance and practice may have provided the students the time to evaluate the efficiency of their own strategies to the new strategies. The students' preferred set of strategies might affect the acceptance of new strategies. The acceptance of new strategies could well be developed over time because the students with preferred set of strategies might resist the application or learning of new strategy. Furthermore, poor comprehenders might need more guidance and

practice to internalise the strategies as taught during the training session.

- The effectiveness of metacognitive strategies plus verbalization should be assessed with participants from different ages. The instructional approach for children from different levels of development might vary.
- Continued research investigating the effects of metacognitive strategies on reading comprehension of students from different age group and children with special needs would even provide a greater understanding of patterns in reading and comprehension development. These might lead to early diagnostic information of children with developmental delays.
- The present study served as an initial challenge to educators to;

I) Give a critical account of processes involved in reading such as metacognition and motivation, or relationship among them.

II) Understand the interplay of motivation in an instructional program.

III) Recognize the cognitive capabilities and different learning strategies brought by each of the participants to the learning situation.

Given the increasing importance of metacognition in reading comprehension and learning, the need for educational researchers to meet these challenges becomes imperative.

10.6 Concluding remarks;

The current investigation provided further insight into interesting issue concerning the strategies and their effect on reading comprehension. Better understanding were gained concerning the influence of variables such as age, grade levels and ability group, number of training sessions, type and source of materials used, and test of significance of treatment effects. The relationship between motivation, strategy use and performance were revealed and various patterns of relationship were discovered. With the use of cognitive rehearsal strategy such as overt and covert verbalization techniques as an additional task during the treatment helped to explain the difference in performance between the experimental groups. However, it is important to note here that no conclusive evidence could be drawn from a single replication of a study that may be too dependent on the particular sample and methodology used to be a safe basis for general conclusions. There is the need for more replication of studies concerning metacognition and its relationship with motivation and verbalization. Another separate meta-analysis focusing on the Pearson correlation index to see the correlation between metacognitive strategies with other variables such as motivation should be conducted.

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Appendix

A. 95% Confidence Interval Table

Appendix A

Confidence Intervals

95% confidence limits : ES + 1.96x e and ES –1.96x e

Author	95% confidence limits Es+1.96*e	95% confidence limits Es-1.96*e	d
Gambrell L.B, and 'Bales, R.J.	1.108	0.376	0.74
Miller G.E	2.236	0.886	1.59
Bauman JF	1.22	0.169	0.69
Bauman JF	0.923	-0.10967	0.40
Rinehart,S.D Stahl, S.A., and Erickson,L.G.	2.629	1.469	2.05
Rinehart,S.D Stahl, S.A., and Erickson,L.G.	1.099	0.136	0.6176
Rinehart,S.D Stahl, S.A., and Erickson,L.G.	0.819	-0.128	0.346
Wittrock,M.C	2.617	1.098	1.857
Wittrock,M.C	1.978	0.524	1.251
Wittrock,M.C	2.469	1.049	1.759
Wittrock,M.C	1.978	0.614	1.296
Wittrock,M.C	2.734	1.261	1.998
Leon, J.A and Carretero,M.,	1.112	0.112	0.612
Sinatra,R.C. , Stahl-Gemake and Berg,D.N.	3.413	-2.169	0.622
Cohen,R.	1.272	0.108	0.69
Brill Morton	3.842	-1.742	1.05
Edynn Yuri Sato	0.342	-0.318	0.012
Edynn Yuri Sato	0.739	0.071	0.405
Edynn Yuri Sato	0.508	-0.154	0.177
Lederer,J.M.	0.876	0.171	0.524
Lederer,J.M.	1.101	0.385	0.743
Lederer,J.M.	1.089	0.373	0.731
Alfassi, M.,	1.503	0.461	0.982
Alfassi, M.,	0.328	-0.668	-0.170
Alfassi, M.,	0.267	-0.730	-0.232
Miranda,A., Villaescusa,M.I, and Abarca,V.	2.032	0.659	1.346
Miranda,A., Villaescusa,M.I, and Abarca,V.	1.202	-0.063	0.570

Miranda,A., Villaescusa,M.I, and Abarca,V.	1.558	0.256	0.907
Hare, V.C., and Borchardt,K.M.,	0.888	-0.609	0.140
Hare, V.C., and Borchardt,K.M.,	1.259	-0.256	0.501
Hare, V.C., and Borchardt,K.M.,	0.838	-0.658	0.090
Hare, V.C., and Borchardt,K.M.,	1.202	-0.309	0.447
Hare, V.C., and Borchardt,K.M.,	1.128	-0.378	0.375
Hare, V.C., and Borchardt,K.M.,	0.367	-1.140	-0.387
Hare, V.C., and Borchardt,K.M.,	0.852	-0.644	0.104
Hare, V.C., and Borchardt,K.M.,	1.830	0.250	1.04
Hare, V.C., and Borchardt,K.M.,	2.131	0.502	1.317
Hare, V.C., and Borchardt,K.M.,	1.530	-0.0109	0.759
Hare, V.C., and Borchardt,K.M.,	0.833	-0.663	0.085
Hare, V.C., and Borchardt,K.M.,	0.979	-0.521	0.229
Hare, V.C., and Borchardt,K.M.,	0.522	-0.978	-0.228
Hare, V.C., and Borchardt,K.M.,	1.085	-0.419	0.333
Hare, V.C., and Borchardt,K.M.,	2.158	0.525	1.342
Hare, V.C., and Borchardt,K.M.,	2.332	0.666	1.499
Hare, V.C., and Borchardt,K.M.,	0.469	-1.033	-0.282
Hare, V.C., and Borchardt,K.M.,	1.601	0.0518	0.826
Kinnunen.,R., and Vauras., M.	2.740	0.352	1.546
Kinnunen.,R., and Vauras., M.	1.885	-0.372	0.756
Kinnunen.,R., and Vauras., M.	1.769	-0.469	0.650
Kinnunen.,R., and Vauras., M.	2.708	0.330	1.519
Boyle., Owen Frank.,	1.705	0.382	1.0436
Boyle., Owen Frank.,	1.741	0.162	0.952
Boyle., Owen Frank.,	1.468	0.162	0.815
Boyle., Owen Frank.,	2.130	1.007	1.568
Hodge,Evelyn Adams	1.067	0.159	0.613
Hodge,Evelyn Adams	0.406	-0.482	-0.038
Alvermann,D.E.	-0.751	-2.329	-1.540
Alvermann,D.E	3.168	1.389	2.278
Paris, S.G.,Cross, D.R., and Cross,	0.653	-0.221	0.216
Paris, S.G.,Cross, D.R., and Cross,	0.606	-0.278	0.164
Paris, S.G.,Cross, D.R., and Cross,	0.844	-0.308	0.268
Paris, S.G.,Cross, D.R., and Cross,	0.693	-0.395	0.149
Lysynchuk, L.M., Pressley, Vye, N.J.	1.061	-0.259	0.401
Lysynchuk, L.M., Pressley, Vye, N.J.	1.146	-0.180	0.483
Lysynchuk, L.M., Pressley, Vye, N.J.	1.086	-0.235	0.425
Lysynchuk, L.M., Pressley, Vye, N.J.	0.220	-1.103	-0.441
Kozminsky,E., and Kozminsky, L.,(LD Vs Voc)	-0.754	-2.093	-1.423
Kozminsky,E., and Kozminsky, L.,(sA-semi acad)	-0.536	-1.343	-0.935

Bossert, T.S, and Schwantes, F.M.	1.090	-0.310	0.39
Mayer,R.E., Bove, W., Bryman, A., Mars, R., Tapangco, L.	1.281	0.472	0.877
Mayer,R.E., Bove, W., Bryman, A., Mars, R., Tapangco, L.	1.226	0.4942	0.860
Mayer,R.E., Bove, W., Bryman, A., Mars, R., Tapangco, L.	0.807	0.117	0.462
Mayer,R.E., Bove, W., Bryman, A., Mars, R., Tapangco, L.	1.205	0.260	0.733
Cordero-ponce, W.L.,	1.487	0.007	0.747
Cordero-ponce, W.L.,	1.146	-0.354	0.396
Cordero-ponce, W.L.,	1.515	-0.013	0.751
Cordero-ponce, W.L.,	1.333	-0.183	0.575
King, C.M.,	1.250757	0.665443	0.9581
Stevens, R., Slavin, R., and Farnish, A.,	1.048	0.592	0.82
Stevens, R., Slavin, R., and Farnish, A.,	0.420	-0.0199	0.2
Stevens, R., Slavin, R., and Farnish, A.,	0.738	0.302	0.52
Stevens, R., Slavin, R., and Farnish, A.,	0.365	-0.065	0.15

Appendix B.2

Summary of several treatment characteristics included in the Meta-analysis

Authors	Publication year	Samples	Method of assignment to groups	Type of students (ability group)	Strategies taught; (Cognitive and metacognitive)With or without Motivation	Sessions 1-5=1, 6-10=2, >10=3, No.information=0.99	length of treament:(In days) <15=1, 15-25=2, >25=3
Gambrell L.B, and 'Bales, R.J.	1986	124	Less stringent	Low ability	Imagery, comprehensive monitoring(cognitive &metacognitive)	1	1
Miller G.E	1985	44	Stringent	Average	comprehensive monitoring-metacognitive	1	2
Bauman JF	1984	66	Stringent	Mixed ability	(determining importance)'main idea-cognitive	2	1
Bauman JF	1984	66	Stringent	Mixed ability	(determining importance) 'main idea	0.99	1
Rinehart,S.D Stahl, S.A., and Erickson,L.G.	1986	70	Stringent	Mixed ability	summarization	0.99	1
Rinehart,S.D Stahl, S.A., and Erickson,L.G.	1986	70	Stringent	Mixed ability	summarization	0.99	1
Rinehart,S.D Stahl, S.A., and Erickson,L.G.	1986	70	Stringent	Mixed ability	summarization	0.99	1

Wittrock,M.C	1991	39	0.99	Low ability	questionning, summarization,main ideas,drawing inferences, imagery (self system, cognitive, metacognitive)	0.99	1
Wittrock,M.C	1991	35	0.99	Low ability	questionning, summarization,main ideas,drawing inferences, imagery (self system, cognitive, metacognitive)	0.99	1
Wittrock,M.C	1991	45	0.99	Low ability	questionning, summarization,main ideas,drawing inferences, imagery (self system, cognitive, metacognitive)	0.99	0.99
Wittrock,M.C	1991	42	0.99	Low ability	questionning, summarization,main ideas,drawing inferences, imagery (self system, cognitive, metacognitive)	0.99	0.99
Wittrock,M.C	1991	45	0.99	Low ability	questionning, summarization,main ideas,drawing inferences, imagery (self system, cognitive, metacognitive)	0.99	0.99

Leon, J.A and Carretero,M.,	1995	72	Stringent	Average	(detrmining importance)'text structure-cognitive	2	2
Sinatra,R.C. , Stahl-Gemake and Berg,D.N.	1984	27	Less stringent	No information	Visual mapping/webbing	0.99	3
Cohen,R.	1983	48	Stringent	Average	self generated questions	0.99	0.99
Brill Morton	1984	60	No information	Mixed ability	text sequencing /'comprehension monitoring (cognitive&metacognitive)	0.99	0.99
Edynn Yuri Sato	1996	139	Stringent	Average	questionning(cognitive and metacognitive)	1	1
Edynn Yuri Sato	1996	139	Stringent	Average	questionning(cognitive and metacognitive)	1	1
Edynn Yuri Sato	1996	139	Stringent	Average	questionning(cognitive and metacognitive)	1	1
Edynn Yuri Sato	1996	139	Stringent	Average	questionning(cognitive and metacognitive)	1	1
Lederer,J.M.	2000	128	Less stringent	Low ability	questionning, summarization,predicting, clarifying	0.99	2
Lederer,J.M.	2000	128	Less stringent	Low ability	questionning, summarization,predicting, clarifying	0.99	2
Lederer,J.M.	2000	128	Less stringent	Low ability	questionning, summarization,predicting, clarifying	0.99	2
Alfassi, M.,	1998	75	Less stringent	Low ability	questionning, summarization,predicting, clarifying	0.99	2
Alfassi, M.,	1998	75	Less stringent	Low ability	questionning, summarization,predicting, clarifying	0.99	2
Alfassi, M.,	1998	75	Less stringent	Low ability	questionning, summarization,predicting, clarifying	0.99	2

Miranda,A., Villaescusa,M.I, and Abarca,V.	1997	40	Stringent	Low ability	attribution/self regulation (self system and metacognitive strategy)	3	3
Miranda,A., Villaescusa,M.I, and Abarca,V.	1997	40	Stringent	Low ability	attribution/self regulation (self system and metacognitive strategy)	3	3
Miranda,A., Villaescusa,M.I, and Abarca,V.	1997	40	Stringent	Low ability	attribution/self regulation (self system and metacognitive strategy)	3	3
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1

Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Hare, V.C., and Borchardt,K.M.,	1984	32	Less stringent	High ability	summarization(cognitive and metacognitive)	1	1
Kinnunen.,R., and Vauras., M.	1995	14	Less stringent	High ability	summarization(cognitive , metacognitive and affective)	0.99	0.99
Kinnunen.,R., and Vauras., M.	1995	13	Less stringent	High ability	summarization(cognitive , metacognitive and affective)	0.99	0.99
Kinnunen.,R., and Vauras., M.	1995	13	Less stringent	High ability	summarization(cognitive , metacognitive and affective)	0.99	0.99
Kinnunen.,R., and Vauras., M.	1995	14	Less stringent	High ability	summarization(cognitive , metacognitive and affective)	0.99	0.99
Boyle., Owen Frank.,	1986	40	Less stringent	High ability	Summarization and mapping(cognitive and metacognitive)	1	2
Boyle., Owen Frank.,	1986	31	Less stringent	High ability	Summarization and mapping(cognitive and metacognitive)	1	2
Boyle., Owen Frank.,	1986	31	Less stringent	High ability	Summarization and mapping(cognitive and metacognitive)	1	2
Boyle., Owen Frank.,	1986	40	Less stringent	High ability	Summarization and mapping(cognitive and metacognitive)	1	2

Hodge,Evelyn Adams	1991	78	Less stringent	High ability	questionning, summarization,predicting, clarifying	3	3
Hodge,Evelyn Adams	1991	78	Less stringent	High ability	questionning, summarization,predicting, clarifying	3	3
Alvermann,D.E.	1988	32	Stringent	High ability	Graphic organizer and lookback	1	1
Alvermann,D.E.	1988	32	Stringent	Low ability	Graphic organizer and lookback	1	1
Paris, S.G.,Cross, D.R., and Cross	1984	81	Stringent	Average	Informed strategies for learning	3	3
Paris, S.G.,Cross, D.R., and Cross,	1984	79	Stringent	Average	Informed strategies for learning	3	3
Paris, S.G.,Cross, D.R., and Cross	1984	48	Stringent	Average	Informed strategies for learning	3	3
Paris, S.G.,Cross, D.R., and Cross	1984	53	Stringent	Average	Informed strategies for learning	3	3
Lysynchuk, L.M., Pressley, Vye, N.J.	1990	36	Stringent	Low ability	summarize, questionning, clarification	3	1
Lysynchuk, L.M., Pressley, Vye, N.J.	1990	36	Stringent	Low ability	summarize, questionning, clarification	3	1
Lysynchuk, L.M., Pressley, Vye, N.J.	1990	36	Stringent	Low ability	summarize, questionning, clarification	3	1
Lysynchuk, L.M., Pressley, Vye, N.J.	1990	36	Stringent	Low ability	summarize, questionning, clarification	3	1
Lysynchuk, L.M., Pressley, Vye, N.J.	1990	36	Stringent	Low ability	summarize, questionning, clarification	3	1
Kozminsky, E., and Kozminsky,L.,	2001	43	Less stringent	Mixed ability	Reading strategies	0.99	0.99
Kozminsky, E., and Kozminsky,L.,	2001	154	Less stringent	Mixed ability	Reading strategies	0.99	0.99
Bossert, T.S, and Schwantes, F.M.	1996	32	Less stringent	Mixed ability	rereading	1	1
Mayer,R.E., Bove, W., Bryman, A., Mars, R., Tapangco, L.	1996	56	Stringent	Mixed ability	Visual and Verbal Summaries	1	0.99
Mayer,R.E., Bove, W., Bryman, A., Mars, R., Tapangco, L.	1996	68	Stringent	Mixed ability	Visual and Verbal Summaries	1	0.99
Mayer,R.E., Bove, W., Bryman, A., Mars, R., Tapangco, L.	1996	68	Stringent	Mixed ability	Visual and Verbal Summaries	1	0.99
Mayer,R.E., Bove, W., Bryman, A., Mars, R., Tapangco, L.	1996	39	Stringent	Mixed ability	Visual and Verbal Summaries	1	0.99
Cordero-ponce, W.L.,	2000	30	Less stringent	Mixed ability	summarization	1	1
Cordero-ponce, W.L.,	2000	28	Less stringent	Mixed ability	summarization	1	1
Cordero-ponce, W.L.,	2000	15	Less stringent	Mixed ability	summarization	1	1
Cordero-ponce, W.L.,	2000	28	Less stringent	Mixed ability	summarization	1	1
King., C.M.,	1999	200	Less stringent	Mixed ability	predicting, summarizing, questioning and claryfying	2	1
Stevens, R., Slavin, R., and Farnish, A.,	1991	320	Less stringent	Mixed ability	main idea comprehension stragies	3	3

Stevens, R., Slavin, R., and Farnish, A.,	1991	320	Less stringent	Mixed ability	main idea comprehension stragies	3	3
Stevens, R., Slavin, R., and Farnish, A.,	1991	333	Less stringent	Mixed ability	main idea comprehension stragies	3	3
Stevens, R., Slavin, R., and Farnish, A.,	1991	333	Less stringent	Mixed ability	main idea comprehension stragies	3	3

Appendix C

C. Letter of Approvals from the University and Ministry of Education Malaysia

C.1 A letter requesting research assistance granted by the University of Durham

C.2. Approval to conduct research in Malaysia was granted from the University of Malaysia, Sarawak

C.3. Permission to conduct research from the Educational Planning and Research Division (EPRD), Ministry of Education, Malaysia (9^{th} March, 2001)

C.4 A letter of approval from JPN on the 9^{th} March 2001

University of Durham

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Fax: (+44/0) 191 374 3506

Secretary: (+44/0) 191 374 3517
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15th January, 2001

To Whom it May Concern:

FAUZAN, Norsiah

This is to confirm that Norsiah Fauzan is a full-time doctoral student at the School of Education, University of Durham. She is currently conducting research on her Ph.D. in 'Cognitive Teaching and Learning Strategies.

I would be very grateful for any support you can give in helping her to obtain samples and information needed for her research.

Please do not hesitate to contact me if I can be of any further help.

M. S. Byram
Professor of Education

Professor Michael Byram MA PhD **Professor Barry Cooper** BA MA DPhil **Professor Carol Fitz-Gibbon** BSc MA PhD FRSS
Professor David Galloway MA MSc PhD **Professor Richard Gott** MA PhD
Professor Ian Mayor BScHons MSc PhD **Professor Joy Palmer** MA MEd PhD **Professor Peter Tymms** MA MEd PhD
Professor Trevor Kerry MSc PhD **Professor William Williamson** BSc MA PhD

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UNIMAS/04-03/06-03 Jilid 14 (30)

14 November 2000

Puan Norsiah Fauzan
Fakulti Sains Kognitif dan Pembangunan Manusia
Universiti Malaysia Sarawak
94300 Kota Samarahan
Sarawak

Puan

Permohonan Untuk Kembali Ke Malaysia Kerana Menjalankan Penyelidikan

Dengan segala hormatnya dimaklumkan bahawa Jawatankuasa Cuti Belajar dalam mesyuaratnya pada 30 Oktober 2000 telah meluluskan permohonan puan untuk kembali ke Malaysia kerana menjalankan penyelidikan.

Sehubungan itu, puan dipohon supaya menghantar jadual dan maklumat berkaitan penyelidikan puan untuk rekod Bahagian ini.

Sekian dan terima kasih.

Yang benar,

Mohd Bakhari M. Yasin
Pengurus Kanan
b.p. Pengarah Pentadbiran

s.k
- Timbalan Naib Canselor
(Penyelidikan dan Khidmat)

- Pengarah
Bahagian Kewangan

- Prof Syed Hassan Syed Ahmad Almashoor
Fakulti Perubatan dan Sains Kesihatan

- Dekan
Fakulti Sains Sosial

- Dekan
Fakulti Sains Kognitif dan Pembangunan Manusia

- Fail peribadi pegawai

KEMENTERIAN PENDIDIKAN MALAYSIA
BAHAGIAN PERANCANGAN DAN PENYELIDIKAN DASAR PENDIDIKAN
PARAS 2, 3 DAN 5, BLOK J
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Ruj. Kami : KP(BPPDP) 13/15 (196)
Tarikh : 9 Mac 2001.

Cik Norsiah Fauzan,
No. 155, Lot 6573,
Taman Matang Jaya,
Jalan Matang,
93050 Kuching,
SARAWAK.

Puan,

Kebenaran Untuk Menjalankan Kajian Di Sekolah-Sekolah, Maktab-Maktab Perguruan, Jabatan-Jabatan Pendidikan Dan Bahagian-Bahagian Di Bawah Kementerian Pendidikan Malaysia

Adalah saya dengan hormatnya diarah memaklumkan bahawa permohonan puan untuk menjalankan kajian bertajuk:

"Meta-Analisis Dan Kajian Empirikal Tentang Keberkesanan Strategi Metacognitive Serta Hubungkaitnya Dengan Unsur Afektif, Pencapaian Dan Pemahaman Di Kalangan Pelajar Pra-Universiti (Tingkatan Enam/Matrikulasi) Di Negeri Sarawak"

telah diluluskan.

2. Kelulusan ini adalah berdasarkan kepada apa yang terkandung di dalam cadangan penyelidikan yang puan kemukakan ke bahagian ini. **Kebenaran bagi menggunakan sampel kajian perlu diperolehi daripada Ketua Bahagian/Pengarah Pendidikan Negeri Yang Berkenaan.** Sila kemukakan ke Bahagian ini senaskah laporan kajian puan setelah ia selesai kelak.

Sekian untuk makluman dan tindakan puan selanjutnya. Terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(DR. AMIR BIN MOHD. SALLEH)
b.p. Pengarah,
Bahagian Perancangan dan Penyelidikan Dasar Pendidikan,
Kementerian Pendidikan Malaysia.

JABATAN PENDIDIKAN NEGERI SARAWAK
BANGUNAN TUN DATUK PATINGGI
TUANKU HAJI BUJANG
JALAN SIMPANG TIGA
93604 KUCHING
SARAWAK

Telefon: 082-243201
FAX: 082-246750
Kawat : PENDIDIKAN

Ruj. Kami: 15 /JP/140/KAJIAN
Tarikh: 9 Mac 2001

Puan Norsiah Fauzan
No. 155, Lot 6573
Taman Matang Jaya,
Jalan Matang'
93050 Kuching

Tuan,

KEBENARAN MENJALANKAN KAJIAN DI SEKOLAH-SEKOLAH, MAKTAB-MAKTAB PERGURUAN, JABATAN-JABATAN PENDIDIKAN DAN BAHAGIAN-BAHAGIAN DI BAWAH KEMENTERIAN PENDIDIKAN MALAYSIA

Dengan hormatnya saya diarah merujuk kepada surat tuan bertarikh 9 Mac 2001.

2. Sukacita dimaklumkan bahawa pada dasarnya Jabatan Pendidikan Negeri Sarawak tiada halangan membenarkan tuan menjalankan kajian bertajuk:

"Meta-Analisis Dan Kajian Emperikal Tentang Keberkesanan Strategi Metacognitive serta Hubungannya dengan unsur Afektif, Pencapaian dan Pemahaman di kalangan Pelajar Pra-Universiti (Tingkatan Enam/Matrikulasi) di Negeri Sarawak"

di Jabatan Pendidikan Negeri Sarawak dan di semua Sekolah Menengah di Sarawak. Walau bagaimanapun, penggunaan sampel di kalangan guru dan pelajar adalah tertakluk kepada kebenaran pengetua sekolah berkenaan.

3. Tuan adalah diingatkan agar mematuhi segala peraturan yang sedang berkuatkuasa dan menjalankan kajian seperti tajuk yang telah ditetapkan oleh Bahagian Perancangan dan Penyelidikan Dasar Pendidikan, Kementerian Pendidikan Malaysia seperti pada surat bil. KP(BPPDP) 13/15 (196) bertarikh 9 Mac 2001.

4. Dengan surat ini, Ketua Jabatan/Pengetua berkenaan adalah dipohon agar memberi bantuan dan kerjasama yang sewajarnya bagi menjayakan kajian tersebut.

Sekian. Harap maklum.

Terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(PONIMAN BIN BEJOK)
Sektor Pengurusan Perkhidmatan Pendidikan,
b.p. Pengarah Pendidikan Sarawak

s.k. Semua: Pegawai Pendidikan Bahagian/Daerah

Appendix D

D. Training script for teachers

D.1 Work Alone training script 1

D.2 Work Alone training script 2

D.3 Group Training Script

D.4 Group Training Script 2

Appendix D.1 Worked Alone Training script (For experimental group 1)

SAMPLE OF LESSON 1 INSTRUCTIONS OF METACOGNITIVE STRATEGIES

The three strategies includes *hypotheses generation, summarizing and question-generating and verbalizing.* When properly used these strategies will improve your comprehension. Although we will use these strategies during the class, it is important that you use them with other reading assignments.

I will demonsrate how to use each strategy with a short passage. After my demonstration with the class you may complete the task alone before you can verbalized the strategies as I have done in the class . You will be given a passage to practise with the strategies. I will now verbalize how to use the four strategies to understand the passage you just read. (Don't give the passage yet, just tell them the Topic)

I will now verbalize how to use the three strategies to understand the passage you just read. (Don't give the passage yet, just tell them the Topic)

1) The first strategy is ***hypotheses generation*** .

Think of what you've known relating to the topic of the passage. Generate the hypotheses related to the topic and what the authors might inform you in the passage. For example: **What do you know about political contributions from the Oil company? If you hypothesized that it is a good contribution, what kind of contributions? If the hypothesis is negative, e.g bad contribution? Why? Do you agree with the political involvement of the Company in the country or overseas??**

WRITE DOWN BRIEFLY THE HYPOTHESIS ON THE WORKSHEETS GIVEN.

NOW GIVE THE PASSAGE TO THE STUDENTS

Read the passage silently.

<u>Ashland's Political Contributions</u>

Ashland Oil, Inc., the country's largest independent refiner and marketer of petroleum products, admitted on June 27, 1975, that the company had made almost $500,000 in questionable payments, over an eight year period to consultants and government officials in Gabon, Nigeria, the dominican Republic, Libya, and perhaps other countries. The company said that in some instance the money may have been used for "unlawful plitical contributions." This disclosure also followed a seventh month study by a special committee of the board of directors.

The company also announced that three official including the chairman, orin E.Atkins, had agreed to opay Ashland $325,000 as reimbursement for illegal political

contributions in the United States. Mr. Atkins had earlier pleaded "no contest to similar charges and a fine of $1,000.

Mr. Atkins will be permitted to repay the total of $175,000 over a five year period. The board unanimously resolved that no changes he made in company management. Much of the company's recent growth, according to the sampany's statement, was attributed to the forceful leadership of Mr.Atkins.

Ashland's solution to the case differed from actions taken buy some firms in similar situations. In some companies, tap management officials have taken early retirement following revelation of illegal political contributions and overseas slush funds. For example, several officials left the Minnesota Mining and Manufacturing compoany following a political funding scandal.

The Ashland board also adopted a series of committee recommendations, one of which was a policy against future illegal payments of any king. (Longebecker, 1985,P.532)

2). The second strategy is ***question-generating while reading.*** Question generating is asking for information related to the topic of the passage . The questions generated should be those you would expect to ***find on a test.***
(Focus on the Ashland Oil Company passage and generate a question)

WRITE DOWN THE QUESTION THAT YOU 'VE GENERATED AND THE ANSWERS YOU'VE FOUND IN THE PASSAGE BRIEFLY ON THE PRACTICE WORKSHEET GIVEN.

Teacher's Words

Can anyone think of a good question while reading the first passage?

What is the serious problem at the Ashland Oil company?

The company has made $500,000 in questionable payments to consultants and officials of a foreign government?

Who is responsible? *It appears that The three officials, includes the chairman of the board was responsible .*
This is the main idea in the first paragraph. The additional information could also be obtained from the second paragrapah.

You can also think of a good question beyond that is directly stated in a passage. What about this question: What inferences can we make about actions taken by the Board to prevent future violations?
To make an inference, look for subtle clues provided by the author. In understanding any text, use any prior knowledge of the topic; if you have no prior knowledge of the topic, ask a teacher or a friend.

To answer the question we generated about Ashland oil, think of what happens to persons when they violate rules or job policies. Based on your knowledge of this situation, what is the answer to our question?

Likely Answers

Set up and enforce stricter regulations against this type of activity. Such enforcement may include removing or demoting persons found guilty, regardless of the position they hold.

We Know from the last sentence that the Board adopted certain recommendations that will deter similar violations.

3). The next strategy will be ***summarizing.*** Summarize the passage by using the generated questions as your guide. The main idea is who or what an author is talking about in a passage.

Summarizing passages you are required to read for your class helps you remember what is important and what will like be asked by your instructor on exams.

(Let's summarize the first paragrapah:

Ashland Oil Company's major officials were found guilty of making illegal contributions to other countries.

WRITE A BRIEF SUMMARY OF THE PASSAGE ON THE PRACTICE WORKSHEET GIVEN.

4). Finally, I want you to take turn to **verbalize the strategies** that you 've used so that you 'll be able to use the strategies spantaneously for the comprehension test.

Comprehension assessment on Passage One (Ashland Political Contribution)

1. **Who are responsible for the unlawful political contributions?**

---

2. **For how long did the Ashland Oil .Company made the questionable payments to the other countries?**

---

3. **Give evidences related to the chairman's involvement in the unlawful political contribution?**

---

4. **What is the action taken by the company against the Chairman?**

---

5. **Infer on the actions taken by the company in the future to prevent future violations?**

Write a brief summary of the passage in your own words.

Appendix D.2 Worked Alone training script 2

Let's continue the discussion of the four strategies of hypothesis generation, question generating, summarizing and verbalization. Hypothesis generation refers to the activation of prior knowledge or experience related to the topic . Based on the prior knowledge related to the topic, generate the hypothesis related to the topic and what the authors might inform in the passage. Question generation refers to asking for information related to the topic addressed. Summarizing refers to making brief statements about something you have read; when summarizing use you own words to explain the author's main idea or state the gist of the passage.

<u>Tearcher's Wording</u>

I will now verbalize how to use the four strategies to understand the passage you just read. (Don't give the passage yet, just tell them the Topic)

1) The first strategy is ***hypotheses generation*** .

Think of what you've known relating to the topic of the passage. Generate the hypotheses related to the topic and what the authors might inform you in the passage. For example: **What do you know about China? If you hypothesized that China is a big country facing a lot of problems? What are the problems? You might say that its facing a geographical and political challenges etc……However they built a sophisticated civilization..**

WRITE DOWN BRIEFLY THE HYPOTHESIS ON THE WORKSHEETS GIVEN.

NOW GIVE THE PASSAGE TO THE STUDENTS

Read the passage silently.

<u>CHINA</u>

Ancient China provides still another example of an earluy people confronting a formidable geographical challenge in order first to survive and then to build a complex and sophisticated civilization. Like the Egyptians,the chinese had inhabited this region of eastern Asia from beginning of human existence:and like Egyptians,they prospered along a great river. But the yellow River was hardly the gentle Nile. It needed to be tamed before it would sustain life,and taming it called for group effort on a massive scale. The success of the chinese in meeting this awesome challenge is reflected in the flowering of chinese civilisation,in the overall political stability of the area and prosperity of its people.As in Mesopotamia,Egypt,and India,so in China there were ware,and dynasty followed dynasty,but political disruption never crippled the chinese cultural evolution. Moreover,the chinese were remarkably successful in governing a huge population settled over a vast area. This success resulted in a political and social stability seldom,if ever,found elsewhere in the ancient world. (Buckler, A History of World Societies, P.82)

2). The second strategy is ***question-generating while reading.*** Question generating is asking for information related to the topic of the passage . The questions generated should be those you would expect to ***find on a test.***
(Focus on the passage about China and generate a question)

WRITE DOWN THE QUESTION THAT YOU 'VE GENERATED AND THE ANSWERS YOU'VE FOUND IN THE PASSAGE BRIEFLY ON THE PRACTICE WORKSHEET GIVEN.

Teacher's Words

Can anyone think of a good question while reading the passage?

What are the problems experienced by the people of China?

Likely Answer
Political, geographical challenges

What conclusion can we draw about the early people of China?
(When drawing a conclusion, you make a decision or reach a decision because of facts or details presented by the writer)

3) The next strategy will be ***summarizing.*** Summarize the passage by using the generated questions as your guide. The main idea is who or what an author is talking about in a passage.

Summarizing passages you are required to read for your class helps you remember what is important and what will like be asked by your instructor on exams.

(Let's summarize the passage):

WRITE A BRIEF SUMMARY OF THE PASSAGE ON THE PRACTICE WORKSHEET GIVEN.

4) Finally, I want to take turn to **verbalize the strategies** that you 've used so that you 'll be able to use the strategies spantaneously for the comprehension test.

Comprehension assessment on Passage One (China)

Who are the challenges experienced by the people of China?

---

2. What does the word "formidable" means in the passage?

3.According to the author, what are the similarities between the Egyptians and the Chinese Civilizations?

---

4. How do you account for the success of the Chinese Civilization?

---

5. What conclusions can we draw about the early people of China?

Write a brief summary of the passage in your own words.

Appendix D.3 Group Training script
(For experimental group 2)

INSTRUCTIONS OF METACOGNITIVE STRATEGIES

The three strategies includes *hypotheses generation, summarizing and question-generating and verbalizing.* When properly used these strategies will improve your comprehension. Although we will use these strategies during the class, it is important that you use them with other reading assignments.

I will demonsrate how to use each strategy with a short passage. After my demonstration with the class you will be assigned to groups. You will be given a passage to practise with the strategies. Each of you in the group will take turns as a group leader performing with your group and verbalized the strategies that you've used as I have done in the class.

I will now verbalize how to use the four strategies to understand the passage you just read. (Don't give the passage yet, just tell them the Topic)

1) The first strategy is ***hypotheses generation*** . It is important that you generate the hypothesis on the topic of the passage to activate your prior /previous knowledge about the topic.

Think of what you've known relating to the topic of the passage. Generate the hypotheses related to the topic and what the authors might inform you in the passage. For example: **What do you know about political contributions from the Oil company? If you hypothesized that it is a good contribution, what kind of contributions? If the hypothesis is negative, e.g bad contribution? Why? Do you agree with the political involvement of the Company in the country or overseas??**

WRITE DOWN BRIEFLY THE HYPOTHESIS ON THE WORKSHEETS GIVEN.

NOW GIVE THE PASSAGE TO THE STUDENTS

Read the passage silently.

Ashland's Political Contributions

Ashland Oil, Inc., the country's largest independent refiner and marketer of petroleum products, admitted on June 27, 1975, that the company had made almost $500,000 in questionable payments, over an eight year period to consultants and government officials in Gabon, Nigeria, the dominican Republic, Libya, and perhaps other countries. The company said that in some instance the money may have been used for "unlawful plitical contributions." This disclosure also followed a seventh month study by a special committee of the board of directors.

The company also announced that three official including the chairman, orin E.Atkins, had agreed to opay Ashland $325,000 as reimbursement for illegal political

contributions in the United States. Mr. Atkins had earlier pleaded "no contest to similar charges and a fine of $1,000.

Mr. Atkins will be permitted to repay the total of $175,000 over a five year period. The board unanimously resolved that no changes he made in company management. Much of the company's recent growth, according to the sampany's statement, was attributed to the forceful leadership of Mr.Atkins.

Ashland's solution to the case differed from actions taken buy some firms in similar situations. In some companies, tap management officials have taken early retirement following revelation of illegal political contributions and overseas sluch funds. For example, several officials left the Minnesota Mining and Manufacturing compoany following a political funding scandal.

The Ashland board also adopted a series of committee recommendations, one of which was a policy against future illegal payments of any king. (Longebecker, 1985,P.532)

2). The second strategy is ***question-generating while reading.*** Questions play an important part of our lives. Much of school is based on answering questions. What are some other occasions or situations when questions are important? (Reading assignments, tests, when we need more information about how to do something). Several reasons why we need to learn to ask questions while reading:

- Questions are ways in which we can test ourselves to make sure we understand what we have read.
- Questions are a good way to focus on important information in a passage.
- With a little practice, it is possible that we can become skilled wnough at questioning that we can predict the kinds of questions we might be asked on a test. This would be very useful while studying.

Question generating is asking for information related to the topic of the passage . The questions generated should be those you would expect to ***find on a test.***
(Focus on the Ashland Oil Company passage and generate a question)

WRITE DOWN THE QUESTION THAT YOU 'VE GENERATED AND THE ANSWERS YOU'VE FOUND IN THE PASSAGE BRIEFLY ON THE PRACTICE WORKSHEET GIVEN.

Teacher's Words

Can anyone think of a good question while reading the first passage?

What is the serious problem at the Ashland Oil company?

The company has made $500,000 in questionable payments to consultants and officials of a foreign government?

Who is responsible? *It appears that The three officials, includes the chairman of the board was responsible .*
This is the main idea in the first paragraph. The additional information could also be obtained from the second paragrapah.

You can also think of a good question beyond that is directly stated in a passage. What about this question: What inferences can we make about actions taken by the Board to prevent future violations?
To make an inference, look for subtle clues provided by the author. In understanding any text, use any prior knowledge of the topic; if you have no prior knowledge of the topic, ask a teacher or a friend.

To answer the question we generated about Ashland oil, think of what happens to persons when they violate rules or job policies. Based on your knowledge of this situation, what is the answer to our question?

Likely Answers

Set up and enforce stricter regulations against this type of activity. Such enforcement may include removing or demoting persons found guilty, regardless of the position they hold.

We Know from the last sentence that the Board adopted certain recommendations that will deter similar violations.

1) The next strategy will be ***summarizing.*** Summarize the passage by using the generated questions as your guide. The main idea is who or what an author is talking about in a passage.

Summarizing passages you are required to read for your class helps you remember what is important and what will like be asked by your instructor on exams.

(Let's summarize the first paragrapah:

Ashland Oil Company's major officials were found guilty of making illegal contributions to other countries.

WRITE A BRIEF SUMMARY OF THE PASSAGE ON THE PRACTICE WORKSHEET GIVEN.

2) Finally, I want the group members to take turn to **verbalize the strategies** that you 've used so that you 'll be able to use the strategies spantaneously for the comprehension test.

Comprehension assessment on Passage One (Ashland Political Contribution)

1. **Who are responsible for the unlawful political contributions?**

---

2. **For how long did the Ashland Oil .Company made the questionable payments to the other countries?**

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3. **Give evidences related to the chairman's involvement in the unlawful political contribution?**

---

4. **What is the action taken by the company against the Chairman?**

---

5. **Infer on the actions taken by the company in the future to prevent future violations?**

Write a brief summary of the passage in your own words.

Appendix D.4
2nd Group training script

Let's continue the discussion of the four strategies of hypothesis generation, question generating, summarizing and verbalization. Hypothesis generation refers to the activation of prior knowledge or experience related to the topic . Based on the prior knowledge related to the topic, generate the hypothesis related to the topic and what the authors might inform in the passage. Question generation refers to asking for information related to the topic addressed. Summarizing refers to making brief statements about something you have read; when summarizing use you own words to explain the author's main idea or state the gist of the passage.

Tearcher's Wording

I will now verbalize how to use the four strategies to understand the passage you just read. (Don't give the passage yet, just tell them the Topic)

1) The first strategy is ***hypotheses generation*** .

Think of what you've known relating to the topic of the passage. Generate the hypotheses related to the topic and what the authors might inform you in the passage. For example: **What do you know about China? If you hypothesized that China is a big country facing a lot of problems? What are the problems? You might say that its facing a geographical and political challenges etc……However they built a sophisticated civilization..**

WRITE DOWN BRIEFLY THE HYPOTHESIS ON THE WORKSHEETS GIVEN.

NOW GIVE THE PASSAGE TO THE STUDENTS

Read the passage silently.

CHINA

Ancient China provides still another example of an earluy people confronting a formidable geographical challenge in order first to survive and then to build a complex and sophisticated civilization. Like the Egyptians,the chinese had inhabited this region of eastern Asia from beginning of human existence:and like Egyptians,they prospered along a great river. But the yellow River was hardly the gentle Nile. It needed to be tamed before it would sustain life,and taming it called for group effort on a massive scale. The success of the chinese in meeting this awesome challenge is reflected in the flowering of chinese civilisation,in the overall political stability of the area and prosperity of its people.As in Mesopotamia,Egypt,and India,so in China there were ware,and dynasty followed dynasty,but political disruption never crippled the chinese cultural evolution. Moreover,the chinese were remarkably successful in governing a huge population settled over a vast area. This success resulted in a political and social stability seldom,if ever,found elsewhere in the ancient world. (Buckler, A History of World Societies, P.82)

2). The second strategy is ***question-generating while reading.*** Question generating is asking for information related to the topic of the passage . The questions generated should be those you would expect to ***find on a test.***
(Focus on the passage about China and generate a question)

WRITE DOWN THE QUESTION THAT YOU 'VE GENERATED AND THE ANSWERS YOU'VE FOUND IN THE PASSAGE BRIEFLY ON THE PRACTICE WORKSHEET GIVEN.

Teacher's Words

Can anyone think of a good question while reading the passage?

What are the problems experienced by the people of China?

Likely Answer
Political, geographical challenges

What conclusion can we draw about the early people of China?
(When drawing a conclusion, you make a decision or reach a decision because of facts or details presented by the writer)

3) The next strategy will be ***summarizing.*** Summarize the passage by using the generated questions as your guide. The main idea is who or what an author is talking about in a passage.

Summarizing passages you are required to read for your class helps you remember what is important and what will be asked by your instructor on exams.

(Let's summarize the passage):

WRITE A BRIEF SUMMARY OF THE PASSAGE ON THE PRACTICE WORKSHEET GIVEN.

4) Finally, I want the group members to take turn to **verbalize the strategies** that you 've used so that you 'll be able to use the strategies spantaneously for the comprehension test.

Comprehension assessment on Passage One (Ashland Political Contribution)

1. **Who are the challenges experienced by the people of China?**

2. **What does the word "formidable" means in the passage?**

3. **According to the author, what are the similarities between the Egyptians and the Chinese Civilizations?**

4. **How do you account for the success of the Chinese Civilization?**

5. **What conclusions can we draw about the early people of China?**

Write a brief summary of the passage in your own words.

Appendix E

Reading comprehension and Vocabulary Test

E.1 Comprehension:Pre-test
E.2 Comprehension:Post-test
E.3 Vocabulary:Pre-test
E.4 Vocabulary:Post-test

Appendix E.1 Comprehension Pre-test

Ujian Pemahaman 1

Petikan 1

Pengkorporatan bermakna penyerahan ,akan tetapi tidak sepenuhnya pengurusan satu-satu badan perusahaan milik pemerintah kepada syarikat atau korporat, yang mengendalikannya atas asas perdagangan. Pindaan ke atas Akta-akta Pendidikan 1995 dan 1996 yang berkait dengan institusi-institusi pengajian tinggi (IPT) telah mempercepatkan proses pengkorporatan IPT di negara kita.

Pengkorporatan IPT amat membantu mengurangkan beban kewangan dan pentadbiran kerajaan. Selama ini semua IPT bergantung sepenuhnya kepada kerajaaan untuk sumber kewangan. Laporan telah menunjukkan bahawa perbelanjaan pendidikan setiap tahun mengambil kira 6% KNK dan 16% daripada jumlah perbelanjaan sektor awam.

Seterusnya, pengkorporatan telah meningkatkan kecekapan pengurusan universiti. Penggunaan penuh sumber-sumber fizikal, manusia dan intelek kerana karenah birokrasi yang selama ini dianggap menghambat perkembangan dan kemajuan IPT dapat dihapuskan kerana IPT mempunyai badan pengurusannya sendiri dan bebas daripada kawalan JPA.

Pengkorporatan IPT menjanjikan syarat-syarat perkhidmatan ganjaran dan kemudahan yang lebih lumayan. Secara umumnya, gaji dan elaun pensyarah dan kakitangan sokongan dijangka naik kira-kira 20%. Peluang kenaikan pangkat yang lebih cerah kerana kenaikan pangkat tidak lagi bergantung kepada kekanan tetapi berlandaskan prestasi.

Pengkorporatan IPT membantu mencegah masalah "brain drain" atau penghijrahan cendekiawan yang akan menjejaskan mutu dan kecemerlangan graduan IPT. Setiap tahun, IPT kehilangan tenaga pengajar dan pakar dalam pelbagai bidang terutama dalam bidang professional seperti perubatan, kejuruteraan dan sebagainya kerana gaji yang ditawarkan di sektor swasta jauh lebih lumayan. Pengambilan tenaga akademik yang terbaik (best brain) seperti pemenang Hadiah Nobel serta professor-professor terkenal di dunia dapat diupah dan menjadi katalis dalam pertumbuhan dan pembangunan IPT.

Keuntungan menjadi ukuran terpenting bagi menentukan kursus atau rancangan yang hendak ditawarkan di IPT. Masalahnya , universiti sebenarnya berfungsi sebagai pusat ilmu dan ilmu bukanlah sesuatu yang boleh dijual beli atau

diperdagangakan. Taraf pencapaian dan kecemerlangan akademik sesebuah IPT mungkin juga terkorban kerana dasar keuntungan yang diamalkan.

Yuran pengajian IPT akan meningkat. Yuran pengajian akan dinaikkan sebanyak 3 hingga 5 kali ganda walaupun peningkatan itu dijangka berlaku secara beransur-ansur. Kos yang lebih tinggi dijangka akan dikenakan untuk pelbagai kemudahan di IPT seperti khidmat perubatan, perpustakaan dan sebagainya. Akibatnya, golongan yang kurang bermampu menghadapi masalah membayar yuran pengajian yang tinggi mereka di IPT.

Belenggu hutang akan bertambah banyak di kalangan siswazah. Walaupun badan-badan tertentu (bank, institusi kewangan, badan korporat) dan pihak kerajaan berjanji menyediakan lebih banyak biasiswa atau pinjaman tetapi ini merupakan satu lagi bebanan hutang kepada siswazah yang baru mula bekerja nanti. Belenggu hutang ini kurang sihat kerana ia akan menimbulkan kesan psikologi yang buruk dan fobia jiwa dalam hidap dan mengakibatkan meluasnya rasuah di kalangan masyarakat.

Usaha pengkorportan sektor perkhidmatan haruslah dilakukan secara sistematis dan mengambil kira kesemua pertimbangan. Memang ada baiknya jikalau pengkorporatan menjamin pembangunan IPT yang lebih baik dan kualiti kecemerlangan di universiti di samping memberikan lebih banyak kebebasan pihak pengurusan universiti serta lebih banyak faedah kepada kakitangannya, sebaliknya pengkorporatan membawa kepada penguasaan universiti oleh golongan tertentu yang hanya memikirkan keuntungan semata-mata tanpa memikirkan tanggungjawab sosial dalam konteks permbangunan negara maka akibatnya sangat parah ke atas kedudukan universiti.

Jawab soalan-soalan yang berikut:

1. Pada pendapat anda, bagaimanakah Pengkorporatan boleh membantu sektor pendidikan dari segi kewangan dan pentadbiran ?.

   a. penyelidikan dan pengambilan tenaga akademik
   b. Meningkatkan pengurusan dan penyelidikan
   c. Meningkatkan pengurusan dan pengambilan tenaga akademik
   d. Mendapatkan sumber kewangan dan penyelidikan

2. Bagaimanakah pihak kerajaan boleh membantu pelajar IPT dalam menangani masalah peningkatan Yuran pengajian?

   a. Melalui dana pendidikan dan menggalakkan sektor swasta dan kewangan, serta badan korporat nenberi pinjaman serta biasiswa kepada belajar.
   b. Menggalakkan institusi kewangan dan badan korporat memberi pinjaman serta biasiswa kepada pelajar
   c. Biasiswa dan pinjaman kerajaan
   d. Menubuhkan persatuan pelajar

3. Bagaimanakah Pengkorporatan universiti ini boleh membantu IPT sebagai pusat ilmu?

   a. keuntungan sebagai ukuran penawaran kursus dan rancangan yang ditawarkan di universiti
   b. menentukan yang kursus dan rancangan yang ditawarkan adalah berkualiti dan mempunyai tenaga akademik yang berkaliber serta mengikut dasar pendidikan negara.
   c. Memastikan kursus yang ditawarkan mendapat publisiti.
   d. Memberi sumber kewangan yang mencukupi bagi membayar tenaga akademik dari luar negara.

4. Jelaskan keburukan Pengkorporatan Universiti ini dari segi sosial?

   a. Meningkatkan gejala rasuah dan hutang di kalangan lepasan siswazah
   b. Meningkatkan gejala rasuah , hutang di kalangan lepasan siswazah serta autokrasi di kalangan golongan tertentu.
   c. Menimbulkan fobia di kalangan golongan yang kurang mampu dan Meningkatkan gejala rasuah, hutang serta autokrasi di kalangan golongan tertentu.
   d. Yuran pengajian yang tinggi serta masalah pengurusan yang mementingkan kewangan

5. Apakah faktor yang mempercepat proses Pengkorporatan?

a. Pindaan ke atas akta pendidikan 1995
b. Penggubalan akta pendidikan 1995 dan 1996.
c. Pindaan akta pendidikan 1995 dan 1996
d. Pindaan ke atas akta pendidikan 1995 dan 1996 berkaitan dengan IPT.

Petikan 2

PJJ merupakan satu corak pendidikan yang semakin penting dan popular dewasa ini. USM telah memperkenalkan corak pendidikan sejak awal tahun 1970an; UKM menawarkan pelbagai kursus seperti sarjana Muda Sastera (Komunikasi, Sarjana Muda Sains, Sarjana Muda Sastera (Komunikasi, psikologi dan lain-lain) dan Diploma Pendidikan bermula sesi 1995/96;UM memperkenalkan kursus Sarjana Muda kejuruteraan dan Sarjana Muda Pengajian Melayu bermula sesi 1996/97, UPM dan UTM turut terlibat dalam program PJJ demikian. PJJ melibatkan situasi yang mana guru dan pelajar berada di tempat berlainan pada kebanyakan masa. Pelajarannya disampaikan melalui modul-modul kursus dan mereka dikehendaki lulus kursus-kursus tersebut dalam peperiksaan yang akan dijalankan pada setiap semester. Ijazah atau diploma akan dianugerahkan kepada calon yang lulus dalam peperiksaan.

PJJ secara langsung membantu negara melahirkan tenaga yang lebih profersional dan berkelayakan. Pelbagai bidang kursus ditawarkan perniagaan, komputer, teknologi maklumat, kejuruteraan, sain mahupun sains social. Memenuhi kehendak atau permintaan kelayakan di sektor awam dan sektor swasta.

PJJ menyediakan banyak peluang pendidikan bagi setiap lapisan masyarakat. Pelajar-pelajar boleh mengikuti kursus-kursus tertentu secara sambilan dan di pusat-pusat tertentu secara sambilan dan di pusat-pusat tertentu yang lebih dekat dengan tempat kerja calon berkenaan. Syarat kemasukan yang lebih selesa; kelayakan minimum dan pengalaman kerja diambil kira.

PJJ memungkinkan pelajar mengadakan jadual pembelajaran yang bersifat fleksibel. Pembelajaran dapat diselaraskan dengan komitmen keluarga dan tugas harian. Penangguhan pelajaran boleh dilakukan dengan syarat masa yang tertangguh itu akan digantikan kelak. Corak pembelajaran ini mengurangkan tekanan di kalangan pelajar.

PJJ menggalakkan pelajar berfikir, berkreatif dan berdisiplin. Corak pembelajaran PJJ memaksa pelajar itu banyak berfikir untuk menyelesaikan sesuatu

permasaalah mahupun tugasan. Guru memberikan bimbingan dari semasa ke semasa sahaja; harus banyak berbincang, merujuk dan mengkaji.

PJJ menyukarkan komunikasi dua hala antara pelajar dan guru secara berkesan. Peluang berbincangan langsung adalah pada tahap minimum kerana mereka berada di tempat yang berbeza. Persidangan video dan rakaman kaset mahupun mesin faks mungkin boleh dieksploitasi sebagai alat komunikasi tetapi teknologi demikian masih tidak dapat menggantikan keberkesanan komunikasi "face to face" seperti yang terdapat dalam bilik darjah. Masalah individu lebih berjaya diselesaikan melalui komunikasi secara langsung. PJJ juga merumitkan usaha mengadakan kerja kumpulan kerana kesukaran untuk mengatur masa-masa yang sesuai untuk menemukan pelajar-pelajar bagi sesuatu perbincangan lokasi dan komitmen berbeza-beza. Kekerapan pertemuan dan tempoh perbincangan amat terbatas.

Proses pembelajaran menjadi satu pengalaman yang amat terasing dan berperibadi. Program ini merenggangkan jalinan sosial kerana pelajar PJJ lebih mementingkan pencapaian dan kemajuan diri. Keseringan untuk bertemu, mengongsi maklumat dan berbincang amat terbatas. Perhubungan pelajar dan tenaga pengajar kurang erat dan mesra, dorongan dan motivasi mahupun kegiatan kaunseling kepada pelajar pada tahap minimum.

Pencapaian pelajar dalam PJJ amat tergantung kepada disiplin dan daya tahan pelajar itu sendiri. Sikap optimistik amat diperlukan untuk menyempurnakan kursus PJJ dalam tempoh seperti yang terancang. Motivasi diri memainkan peranan dalam menentukan kejayaan.

PJJ ini sememangnya mempunyai baik-buruknya yang tersendiri. Apa yang jelas ialah program ini tetap menjadi semakin popular dan mendapat sambutan dari pelbagai lapisan masyarakat. PJJ berperanan menambahkan bilangan tenaga mahir dan professional di pasaran seta mempercepatkan proses pembangunan negara. Perancangan yang rapi harus diadakan agar mutu dan kehendak sumber. Tujuan negara dipenuhi dan bukan untuk mengaut keuntungan optimum daripada program ini.

Jawab semua soalan di bawah ini?

6. Berikan definisi PJJ?

a. Guru dan pelajar berada di tempat yang berlainan dan berinteraksi melalui koresponden

b. Guru dan pelajar berada di tempat yang berlainan dan pengajaran disampaikan melalui modul-modul

c. Guru dan pelajar berada di tempat yang berlainan di kebanyakan masa dan pengajaran disampaikan melalui modul-modul.

d. Guru dan pelajar hanya berjumpa pada waktu-waktu yang ditetapkan.

7. Apakah keburukan PJJ?

a. Guru dan pelajar jarang berjumpa.

b. Tidak dapat membuat kerja secara berkumpulan dan mengelakkan keberkesanan komunikasi antara pengajar dan pelajar.

c. Pelajar boleh meniru tugasan daripada pelajar lain.

d. Guru dan pelajar hanya boleh berinteraksi melalui internet dan konferens.

8. Bagaimanakah Institusi yang menawarkan kursus PJJ boleh menjaga kualiti pengajaran dan pengajarannya?

a. Mengadakan tele-konferensi dan sentiasa berhubung melalui e-mel bagi menyelesaikan masalah pembelajaran .

b. Menubuhkan satu cawangan di setiap negeri untuk mengadakan pertemuan dengan pelajar.

c. Tidak memberikan markah yang terlalu tinggi kepada para pelajar PJJ

d. Pelajar sentiasa menghantar kerja kursus pada masa yang ditetapkan.

9. Bagaimanakah seseorang pelajar jarak jauh boleh mencapai kejayaan dalam kursus yang ditawarkan?

a. PJJ menggalakkan pelajar agar lebih kreatif dan berdisiplin dan ini memberikan kejayaan kepada pelajarPJJ

b. PJJ menggalakkan pelajar agar boleh berfikir, kreatif dan berdisiplin serta sentiasa merujuk dan mengkaji .
c. PJJ menggalakkan pengalaman belajar sendiri dan ini menambahkan lagi ilmu pelajar PJJ.
d. Pelajar PJJ sentiasa kreatif dan mempunyai motivasi yang tinggi untuk mencapai kejayaan yang cemerlang.

10. Jelaskan bagaimana kursus ini boleh mengembangkan daya kreativi pelajar?
    a. Corak pembelajaran PJJ yang fleksibel dan tidak membebankan mengembangkan lagi daya berfikir dan kreativiti pelajar.
    b. Corak pengajaran dan pembelajaran PJJ menggalakkan pelajar agar berfikir sendiri untuk menyelesaikan masalah dan tugasan
    c. Corak pengajaran dan pembelajaran yang tidak bebas dan tidak terlalu bergantung pada Guru menggalakkan daya kreativiti pelajar.
    d. Pengalaman serta corak pembelajaran yang fleksibel menggalakan lagi daya berfikir dan kreativi pelajar.

Petikan 3

Kemajuan sains dan teknologi yang pesat telah meningkatkan daya pengeluar an di pelbagai sektor perindustrian, pertanian, perubatan dan lain-lain. Akan tetapi, masyarakat umum kurang menyedari bahawa penggunaan bahan kimia yang berlebihan akan mengakibatkan beberapa kesan buruk terhadap kesihatan manusia dan persekitaran.

Penggunaan bahan-bahan kimia yang berlebihan di sektor pertanian boleh menjejaskan kesihatan manusia. DDT, Chiordane dan Heptachior boleh mengakibatkan keracunan makanan melalui sayur-sayuran. Pada bulan Februari 1988, kerajaan Singapura pernah memberhentikan import sayur-sayuran dari Cameron Highlands kerana sayur-sayur itu didapati mengandungi racun kimia yang melebihi paras keselamatan sesperti yang ditetapkan oleh Petubuhan Kesihatan Sedunia. Akibatnya, petani-petani yang terbabit terpaksa memusnahkan sayur-sayuran itu dan menanggung segala kerugian. Dalam jangka masa panjang, bahan-bahan kimia itu akan mengakibatkan penyakit yang berbahaya seperti penyakit kanser, muntah, dan cirit-birit.

Bahan-bahan kimia sebagai pengawet, pewarna dan perasa tiruan dalam pemprosesan makanan menimbulkan risiko terhadap kesihatan manusia. Asid benzoid dalam pelbagai jenis sos dan jus buah-buahan minuman ringan mengakibatkan gangguan urat saraf dan alergi. Pewarna kuning dalam taukua dan lain-lain bukan sahaja tidak berkhasiat, malah menyebabkan penyakit barah dan kemandulan kaum lelaki. Perasa tiruan seperti Monosodium Glutamat (MSG) yang luas digunakan di restoran boleh mengakibatkan kecacatan otak dan kerencatan kanak-kanak serta keguguran rambut.

Penggunaan ubat secara berlebihan menimbulkan kesan-kesan negatif. Aspirin yang digunakan untuk menghilangkan demam mengandungi bahan etanoik anhidrdida dan asid salisilik boleh mengakibatkan kerencatan otak kanak-kanak. Ubat steroid yang diambil oleh para atlit untuk memperkuatkan otot-otot dan kecergasan badan akan mengakibatkan pertambahan hormon lelaki dan selanjutnya membawa perubahan fizikal pengguna. Penyelidikan klinikal menunjukkan bahawa pesakit yang dirawat melalui dadah thalidomide yang berlebihan akan mengakibatkan kecacatan anggota badan (tangan dan kaki) kanak-kanak.

Penggunaan bahan-bahan kimia berlebihan di sektor perindustrian mengancam keselamatan alam sekitar dan kesihatan manusia. Pembuangan sisa-sisa toksid dan penggunaan klorofluorokarbon serta aerosal di sektor perindustrian dan di rumah mengakibatkan hakisan lapisan ozon. Akibatnya, iklim dan unsur biologi serta ekologi bumi menjadi tidak seimbang atau stabil. Bumi turut menjadi semakin panas. Manusia pula diserang penyakit kanser kulit akibat pendedahan berlebihan kepada cahaya ultraungu/ultraviolet. Buktinya di Amerika Syarikat, IMOS meramalkan bahawa terdapat pertambahan antara 2 1000 hingga 15 000 kes penyakit kanser kulit setahun akibat sebanyak 1% penipisan lapisan ozon. Kesan sampingan lain termasuklah penyakit mata, gangguan system fisio atau fizikal manusia.

Banan-bahan yang dieksploitasi untuk mencipta senjata nuclear juga akan mengancam keselamatan dunia. Pelbagai jenis senjata nuklear yang dicipta oleh kuasa-kuasa besar seperti Amerika Syarikat, Rusia, China-Jepun dan sebagainya, boleh disalahgunakan untuk tujuan peperangan, pengorbanan manusia dan kerosakan harta benda berbilion-bilion ringgit. Bahan radioktif akibat peletupan bom nuclear dan senjata kimia akan menyebabkan merebaknya penyakit kanser, kemandulan dan perubahan genetic manusia dan pencemaran alam sekitar. Akibatnya ekonomi dunia dan seluruh pembekalan makanan pada peringkat global terjejas.

Penggunaan bahan kimia secara berlebihan dan tanpa kawalan yang wajar pasti akan membawa padah kepada manusia dan alam sekitar. Setiap pihak harus menyedari masalah-masalah yang timbul akibat gejala tersebut. Pencegahan merupakan langkah yang terbaik untuk mengelakkan risiko seperti yang telah diperbincangkan tadi.

Jawab soalan-soalan yang berikut:

11. Apakah cara paling berkesan untuk mengelakkan petani-petani daripada menggunakan bahan-bahan kimia yang berlebihan?
    a. Memberikan penerangan tentang bahaya penggunaan bahan-bahan kimia yang berlebihan terhadap para petani.
    b. Persatuan pengguna hendaklah meluaskan lagi publisiti dan menghantar pegawai pertanian untuk memberi penerangan tentang bahayanya penggunaan bahan-bahan kimia yang berlebihan terhadap para petani .
    c. Mengenakan hukuman yang berat kepada para petani yang didapati bersalah menggunakan bahan kimia yang berlebihan.
    d. Menyiarkan dokumentari khas tentang bahayanya penggunaan bahan kimia yang berlebihan dalam pemakanan.

12. Apakah kesan-kesan jangka panjang penggunaan Asid Benzoid dalam pemakanan?
    a. sakit urat saraf dan alergi
    b. sakit mental dan keguguran
    c. keguguran rambut dan kerencatan otak
    d. keracunan dan kanser

13. Apakah cadangan yang paling berkesan untuk menimbulkan kesedaran terhadap penggunaan bahan kimia yang berlebihan dalam industri pemakanan?
    a. Hukuman yang berat terhadap kilang yang tidak melabelkan bahan-bahan kimia yang digunakan dalam pemakanan.
    b. Persatuan pengguna hendaklah aktif dalam memberikan kesedaran terhadap pengguna

c. Jabatan kesihatan hendakah membuat pemeriksaan dan mengenakan hukuman yang berat terhadap industri yang didapati menggunakan bahan kimia yang berlebihan dalam pemakanan yang dikeluarkan.
d. Mengedarkan risalah serta poster tentang bahayanya penggunaan bahan kimia yang berlebihan dalam industri pemakanan.

14. Bagaimanakah penggunaan bahan kimia yang berlebihan di sektor perindustrian boleh mengancam alam sekitar?

a. Pembuangan toksid sewenang-wenangnya serta penggunaan aerosol yang menghakis lapisan ozon.
b. Penggunaan bahan kimia boleh mengganggu ekologi dan iklim bumi.
c. Penipisan ozon akan menyebabkan pancaran ultra ungu secara langsung dan mengakibatkan penyakit.
d. Petani-petani yang menggunakan bahan kimia yang berlebihan dan mengganggu stabiliti ekologi.

15. Berikan bukti peristiwa lepas yang menunjukkan bagaimana bahan radioaktif telah mendatangkan kesan buruk terhadap kesihatan?

a. Peristiwa Peperangan dunia I
b. PeristiwaLetupan Bom di Hiroshima
c. Peristiwa di Cynobyll Russia
d. Peperangan Teluk .

Petikan 4

Lapisan ozon ialah lapisan udara kira-kira 4.2 kilometer dari bumi. Ozon terdiri daripada sejenis gas yang terbentuk daripada cantuman tiga atom oksigen. Kehilangan lapisan ozon kira-kira 3% di kawasan khatulistiwa dan Tropika kebelakangan dipercayai membawa kesan bencana alam yang agak membimbangkan.

Pencemaran dari pelbagai bentuk industri yang banyak mengeluarkan bahan kimia kloroflurokarbon (CFC) merupakan punca utama masalah penipisan ozon. Contohnya, Klorin, fluorin dan karbon yang dicipta dan digunakan sebagai gas penyejuk di dalam peti sejuk dan penyaman udara , bahan-bahan campuran dalam

membuat plastik busa dan Aerosol (penyembur ubat nyamuk) CFC yang dibebaskan ke bahagian traposfera akan meningkat ke bahagian stratosfera bumi dan bertindak balas dengan pancaran ultraungu dan kompaun lain untuk membentuk pelbagai bentuk radio aktif yang akan mempercepatkan kadar penipisan ozon.

Penggunaan pengangkutan udara di ruang udara seperti penggunaan kapal terbang supersonik sivil dan tentera di bahagian stratosfera juga akan mengeluarkan oksida nitrogen dan menyerang lapisan ozon melalui gas-gas ekzosnya.

Antara lain, masalah ini juga diburukkan lagi oleh pembakaran pelbagai bahan buangan di bumi seperti manyak, gas, arang batu, kayu dan najis haiwan oleh manusia menghasilkan sebatian yang akhirnya meresapi ke stratosfera dan mengurangkan lapisan ozon. Akhir sekali,peperangan serta peletupan nuklear di atmosfera dijangka memberi kesan buruk terhadap masalah hakisan lapisan ozon. Contohnya, perang nuclear sedunia dijangka akan mengurangkan ozon antara 20%-70%.

Fenomena hakisan lapisan ozon ini secara tidak disedari telah memberi kesan buruk terhadap manusia itu sendiri dan alam sekitar. Gangguan iklim secara makro dan mikro merupakan salah satu daripada kesan hakisan lapisan ozon. Tindakbalas CFC dan gas ozon mengakibatkan dan mempercepatkan fenomena alam yang dinamakan kesan rumah hijau. Akibatnya, lapisan udara bumi semakin panas. Ketidakstabilan cuaca seterusnya akan mengakibatkan bencana alam seperti banjir, kemarau, taufan dan sebagainya yang semakin menjadi-jadi tidak " mengikut musim". Di kawasan kutub pula, lapisan air batu yang mencair mungkin menyebabkan aras laut meningkat dan menenggelamkan pulau-pulau di kawasan pantai. Kejadian bencana alam akan merosakkan harta dan mengorbankan nyawa manusia secara besar-besaran.

Malah perubahan iklim bumi seperti kemarau yang berpanjangan menyebabkan kecekapan pembersihan sumber air semula jadi dikurangkan. Akibatnya, manusia menghadapi masalah sumber bekalan air bersih untuk kehidupan seharian.

Penipisan lapisan ozon boleh meningkatkan pelbagai jenis penyakit. Pakar saintis Amerika menganggarkan bahawa penipisan ozon sebanyak 20% akan menambahkan kira-kira 142 000 kes penyakit kanser kulit setiap tahun menjelang tahun 2025. Cahaya ultraungu juga boleh merosakkan DNA dan mutasi serta mengakibatkan kecacatan penglahiran.

Hasil-hasil pertanian juga akan berkurangan. Ini ialah kerana pancaran ultraungu akan memusnahkan sel dan mikro organisme dalam tumbuhan dan binatang. Akibatnya, genetic tumbuhan dan binatang terganggu dan ini akan mengurangkan hasil-hasil pertanian dan ternakan.

Penipisan lapisan ozon dari ruang angkasa bumi membawa pelbagai bencana alam yang menjejaskan bumi dan kehidupan. Langkah-langkah mengawal haruslah diambil oleh setiap pihak untuk menyelamatkan bumi yang tercinta ini.

Jawap soalan-soalan yang berikut:

16. Lapisan Ozon
    a. lapisan udara kira-kira 4.2 km dari bumi
    b. lapisan tiga atom oksigen dan tebalnya 4.2 m
    c. lapisan atom oksigen yang letaknya 4.2 kilometer dari bumi.
    d. lapisan gas yang terdiri daripada tiga atom oksigen dan terletak 4.2 km dari bumi

17. Apakah yang menyebabkan berlakunya penipisan ozon?
    a. Gas ekzos daripada pengangkutan awam dan udara
    b. Pengangkutan udara, pembakaran dan kluorofluorokarbon.
    c. Nitrogen, pembakaran dan gas ozon
    d. Cahaya ultra ungu, nitrogen dan kluorofluorokarbon.
    e.

18. Bagaimanakah fenomena hakisan lapisan ozon ini mendatangkan kemudaratan kepada manusia?
    a. melalui cahaya ultra ungu.
    b. melalui gas kluoroflorokarbon
    c. melalui pembakaran sampah sarap dan pelbagai bahan kimia
    d. melalui kesan rumah hijau.

19. Jelaskan punca utama kesan rumah hijau?
    a. Tindakbalas ozon dan nitrogen .
    b. Tindakbalas CFC dan gas ekszos

c. Interaksi cahaya ultra ungu dan nitrogen.
d. Interaksi CFC dan gas ozon

20. Cadangkan langkah-langkah yang berkesan untuk mengawal masalah penipisan ozon?
    a. Mengenakan tindakan kepada pembalak dan para petani yang membakar sewenang-sewenangnya.
    b. Pihak pencinta alam harus mengawalnya dengan mengadakan demonstrasi.
    c. Persatuan Bangsa-bangsa bersatu seluruh dunia haruslah berbincang dan mencari jalan penyelesaian terhadap masalah ini.
    d. Kerajaan,Persatuan pencinta alam dan pihak NGO haruslah sama-sama menyelesaikan masalah global ini.

Petikan 5

Permainan video kini menjadi 'wabak' di kalangan muda-mudi. Contohnya, siasatan yang dilakukan oleh polis di Lembah kelang dan Petaling Jaya kebelakangan ini menunjukkan sekurang-kurangnya 400 orang kanak-kanak membanjiri kira-kira 20 pusat permainan video setiap hari.

Pusat permainan video yang tumbuh seperti cendawan di pusat-pusat Bandar menyebabkan ramai muda-mudi yang tertagih dengan permainan tersebut. Kebanyakan daripada masa lapang mereka dihabiskan di pusat-pusat permainan video. Golongan yang sering mengunjungi pusat-pusat tersebut adalah muda-mudi yang di bawah umur 16 tahun . Dengan itu, mereka sering mengabaikan tugas atau pelajaran mereka.

Akibatnya, kebanyakan muda-mudi menjadi kaki lepak dan inginkan keseronokan khususnya pada masa lapang. Hasil daripada pendedahan yang kerap terhadap siri program yang penuh aksi dan bercorak agresif seperti Rambo, Adventure, Moon Walker dan lain-lain, mereka mula bertindak ganas dan kurang bertanggujawab.

Ini menunjukkan permainan video boleh meruntuhkah akhlak atau moral di kalangan muda-mudi. Masalah ini boleh juga dikatakan berpunca daripada para peniaga yang bermatlamatkan keuntungan perjudian. Contohnya program "New

Pinpall", "Turf King" dan sebagainya. Begitu juga dengan program yang mengandungi grafik atau gambar yang lucah yang meracuni fikiran muda-mudi dan mengakibatkan muda-mudi terjerumus ke dalam kegiatan jenayah atau kegiatan yang kurang diingini.

Walaubagaimanapun, kita tidak dapat menafikan bahawa permainan video ini merupakan satu industri yang telah berkembang maju sebagai satu industri atau perniagaan baru. Contohnya, The Japanese company Nintedo di Jepun dijangka menjual 8 juta sistem permainan dan lebih daripada 50 juta pita permainan pada satu-satu tahun kebelakangan ini. Kini, industri permainan video tersebut terus berkembang dan melibatkan modal sebanyak RM5 juta setahun.

Daripada segi pendidikan, permainan video telah berupaya mengembangkan kemahiran pemikiran (kognitif) manusia. Permainan video yang manarik dapat mewujudkan suasana yang dinamik dan merangsangkan serta mengembangkan kemahiran bermain yang melibatkan daya imaginasi, kreativiti, penglihatan, taakulan dan persepsi ruang seseorang. Ini bermakna, permainan video membantu mempercepatkan proses pembelajaran pelajar-pelajar.

Sesuai dengan zaman teknologi yang canggih , pihak pengeluar juga telah mendakwa bahawa permainan video menyediakan asas yang baik untuk menggunakan komputer dalam penyelesaian masalah . Dalam permainan video , seseorang pemain harus dapat mengawal masalah, memikirkan permasalahan secara pantas dan bertindak cepat serta tepat di samping kemahiran mengawal koordinasi tangan –mata.

Tingkat tindak-balas dan koordinasi yang deperlukan dalam permainan video telah diakui ahli terafi dapat membantu mengubati pesakit-pesakit yang menghidap penyakit kerencatan otak dan fizikal di samping menolong memulihkan pesakit-pesakit yang mengalami penyakit strok.

Permainan video ini sudah bertapak dan menjadi sebahagian hidup muda-mudi pada zaman ini. Walaubagaimanapun, kebaikan yang peroleh daripada permainan ini juga tidak bermakna permainan ini boleh dibiarkan berleluasa sehingga dapat menghancurkan masa depan muda-mudi. Pihak ibu bapa haruslah mengawal masa permainan video di kalangan anak-anak mereka supaya tidak tertagih dan memupuk minat anak-anak mereka terhadap aktiviti-aktiviti lain yang berfaedah.

Antara lain, pemilihan program haruslah dilakukan untuk mengelakkan segala kesan negatif seperti unsur keganasan budaya kuning dan sebagainya. Muda-mudi

haruslah bertanggungjawab dan mengagihkan masa antara permainan dan tugasan seharian. Pihak autoriti juga harus bertindak tegas dalam membuat pemeriksaan terhadap pusat-pusat permainan video dari semasa ke semasa untuk mencegah penyalahgunaan yang mungkin wujud. Jika perlu, lesen perniagaan pusat-pusat permainan video yang melanggar peraturan haruslah ditarik balik untuk mengelakkan kesan-kesan sampingan.

Sememangnya, permainan video merupakan satu jenis permainan menyeronokkan khususnya pada masa-masa lapang. Langkah-langkah yang sewajarnya haruslah diambil oleh pelbagai pihak untuk mengelakkan kesan-kesan sampingan.

21. Apakah kesan-kesan sampingan akibat daripada "wabak" permainan video?
    a. muda-mudi mengabaikan tugas dan pelajaran mereka.
    b. Muda-mudi menghabiskan masa mereka dengan melepak dan berseronok
    c. Muda-mudi sering mengabaikan tugas, pelajaran, melepas, berseronok dan mudah terpengaruh dengan adegas ganas.
    d. Muda-mudi mengabaikan pelajaran, berseronok dan terpengaruh dengan permainan ganas lantas terjerumus dengan kegiatan jenayah.

22. Jelaskan bagaimana permainan video boleh meruntuhkan akhlak atau moral di kalangan muda-mudi?
    a. Dengan semakin kerapnya muda-mudi mengunjungi pusat permainan video ini
    b. Dengan kerapnya muda-mudi mengunjungi pusat permainan video dan pendedahan terhadap program yang penuh aksi dan agresif.
    c. Pendedahan yang kerap terhadap siri program yang penuh aksi serta agresif dan wabak permainan video yang semakin berleluasa.
    d. pendedahan yang kerap terhadap siri program yang penuh aksi serta agresif.

23. Bagaimanakah permainan video ini boleh mendatangkan keuntungan pada ekonomi negara?
    a. Penjualan sistem dan pita permainan di dalam dan ke luar negara boleh mendatangkan keuntungan pada ekonomi negara.

b. Menubuhkan pusat permainan video yang boleh menarik perhatian muda-mudi dan ini menyumbangkan jumlah yang banyak terhadap industri permainan video.

c. Penubuhan industri pemainan video boleh membantu dalam pendidikan dan ini dapat mengeluarkan para intelektual yang berkembang dari segi kognitif.

d. Pertimbuhan industri permainan video boleh membantu sektor pendidikan dan sektor perubatan dan ini memberi sumbangan terhadap ekonomi negara.

24. Bagaimanakah permainan video boleh membantu dari segi kognitif dan perubatan?

a. Mengembangkan daya imaginasi, kreativiti, penglihatan, taakulan dan persepsi ruang seseorang serta meningkatkan tindak-balas dan koordinasi seseorang.

b. Membantu dalam penyelesaian masalah dan meningkatkan tindak-balas dan koordinasi seseorang.

c. Mengembangkan daya imaginasi, kreativiti , penyelesaian masalah serta masalah tindak-balas dan koordinasi seseorang yang mengalami penyakit strok.

d. Mengembangkan daya imaginasi, kreativiti, penglihatan, taakulan dan persepsi ruang seseorang serta terafi bagi pesakit yang mengalami kerencatan otak , fizikal dan strok.

25.Apakah langkah-langkah yang harus dilaksanakan untuk mengawal wabak "permainan video" ini?

a. peranan ibu-bapa dalam mengawal muda-mudi dan memilih program-program bagi mengisi masa lapang pelajar, serta tindakan otoriti yang tegas membuat pemerikasaan terhadap pusat permainan video yang tidak mengikut peraturan.

b. Peranan ibu-bapa dalam mengawal muda-mudi dan tindakan otoriti yang tegas membuat pemeriksaan dan dendaan terhadap pusat permainan video yang melanggar peraturan.

c. Peranan ibu-bapa dalam mengawal muda-mudi dan tindakan otoriti yang tegas membuat pemeriksaan dan menarik lesen perniagaan pusat permainan video.

d. peranan ibu-bapa dalam mengawal muda-mudi, memupuk minat terhadap aktiviti yang berfaedah dan memilih program-program bagi mengisi masa lapang pelajar, serta tindakan otoriti yang tegas membuat pemerikasaan terhadap pusat permainan video yang tidak mengikut peraturan.

Petikan 6

El-Nino lazimnya dikaitkan dengan kehadiran ombak besar dan puting beliung tanpa mengira masa. El-Nino menjadi sebutan hampir seluruh dunia kerana pelbagai bencana alam dikatakan berpunca daripada fenomena ini: ribut, banjir, suhu panas dan sebagainya.

Punca utama fenomena El-Nino ialah pemanasan udara yang tidak seragam. Udara pada permukaan laut yang panas di Amerika Selatan akan meruwap dan naik ke atas membentuk awan dan akhirnya menghasilkan hujan di laut berkenaan (Lautan Pasifik). Sebaliknya di Kepulauan Indonesia, akibat daripada suhu permukaan yang rendah, udara akan turun ke bawah dan tidak mampu membentuk awan bagi menghasilkan hujan. Angin yang bertiup pula berupa angin kering dan sejuk yang tidak membawa hujan. Kesannya, Indonesia dilanda kemarau teruk.

Seterusnya, antara punca berlakunya El-Nino ialah pergerakan arus udara. Arus lautan yang panas bergerak secara songsang dari barat ke timur. Pemindahan haba dari kawasan Khatulistiwa ke bahagian kutub dalam bentuk yang dipanggil sel perolakan haba.

Fenomena El-Nino ini telah membawa pelbagai akibat atau kesan yang buruk kepada dunia dan hidupannya. Antaranya ialah terjejasnya kuantiti hidupan laut. Proses pergolakan air lautan pasifik meningkatkan suhu air permukaan kira-kira 5 °C dan air dasar lautan yang lebih sejuk sebaliknya tidak dapat naik ke permukaan. Akibatnya, populasi plankton kekurangan. Apabila plankton berkurangan, ikan serta hidupan laut akan mengalami kekurangan makanan dan ini akan turut menjejaskan kuantiti hampir semua jenis haiwan/hidupan laut.

Antara bencana alam akibat daripada El-Nino ialah Banjir besar dan kemarau yang berpanjangan, ribut petir dan sebagainya yang mengancam nyawa manusia dan merosakkan harta benda manusia. Contohnya, hujan lebat di Equador dan Peru meyebabkan banjir serta tanah runtuh yang mengganggu sistem penempatan dan pengangkutan. Begitulah keadaannya di Amerika Utara, Indonesia dan Australia. Korea Selatan dan beberapa negara di Afrika pula menghadapi kemarau yang berpanjangan. .

Kemarau yang teruk berpanjangan akibat El-Nino meyebabkan hasil pengeluaran merosot sehingga mengakibatkan kebuluran berjuta-juta manusia serta haiwan ternakan. Hujan lebat dan banjir yang melanda menjejaskan kegiatan menangkap ikan dan selanjutnya mengurangkan hasil tangkapan ikan.

El-Nino secara tidak langsungnya telah mengakibatkan perebakan penyakit. Kajian saintifik membuktikan bahawa hujan El-Nino yang lambat dan berpanjangan telah mewujudkan kembali penyakit yang dibawa oleh sejenis pepijat daripada tikus yang pernah mengakibatkan jumlah kematian yang sangat besar pada tahun 1340. Penyakit-penyakit yang berkaitan akan bertambah: selsema,malaria,cacar,cirit-cirit, kolera dan sebagainya.

El-Nino merupakan fenomena alam yang berbahaya kepada kehidupan alam dan manusia. Tiada cara yang dapat mengatasi ataupun menghalangi El-Nino daripada melanda. Apa yang dapat dilakukan ialah "menyesuaikan diri dengan persekitaran akibat perubahan yang berlaku

26. Bagaimanakah El-Nino boleh menyebabkan berlakunya kemarau?

a. Udara permukaan laut yang panas dan meruwap akan membentuk angin yang akhirnya menyebabkan kemarau.
b. pemanasan udara yang tidak seragam.
c. Pergerakan arus udara yang bergerak secara songsang serta pemindahan haba dari khatulistiwa ke bahagian kutubmenyebabkan kemarau melanda
d. Apabila suhu permukaan rendah, udara akan turun ke bawah dan tidak mampu membentuk awan bagi menghasilkan hujan, angin kering yang bertiup dan sejuk serta tidak membawa hujan menyebabkan a kemarau teruk

27. Jelaskan dengan ringkas punca berlakunya El-Nino?

a. Pemanasan udara yang tidak seragam dan pergerakan udara.
b. Ombak dan puting beliung arus
c. Suhu permukaan yang rendah
d. Pergerakan angin secara songsang

28. Apakah kesan-kesan buruk El-Nino terhadap kehidupan manusia?

a. bencana alam serta pengurangan hasil pertanian dan kebuluran.
b. Bencana alam, pengurangan hasil pertanian , kebuluran dan penyakit.
c. Banjir dan kemarau
d. Menjejaskan hidupan laut dan pertanian

29. Adakah El-nino merupakan satu fenomena baru, berikan bukti anda?

a. Ya, kerana fenomena ini hanya wujud pada tahun-tahun kebelakangan ini.
b. Ya, kerana fenomena ini baru dan tidak dinyatakan dalam buku sejarah.
c. Tidak, kerana fenomena ini pernah berlaku di Indonesia dan filipina
d. Tidak, kerana fenomena ini pernah menyebabkan wabak penyakit pada tahun 1340.

30. ". Apakah yang dimaksudkan oleh pengarang dengan "menyesuaikan diri dengan persekitaran akibat perubahan yang berlaku"?

a. manusia hanya mampu mencegah daripada berlakunya fenomena alam.
b. Manusia terpaksa menyesuaikan diri dengan perubahan yang berlaku akibat bencana yang tidak dapat dielakkan.
c. Manusia harus mencari jalan agar dapat terus hidup dengan perubahan yang b erlaku akibat bencana.
d. Manusia harus bersyukur terhadap kehendak Tuhan.

Petikan 7

Projek hidroelektrik yang terbesar di Asia Tenggara: bernilai RM15 bilion; benteng empangan dibina merentangi sungai Balui: mempunyai ketinggian mencapai 205 meter, dan lebarnya 300 meter. Projek ini dijangka mula beroperasi pada tahun 2003 jika berjalan lancar (malangnya projek ini akhirnya ditangguhkan).

Projek pembinaan empangan ini telah mendapat tentangan bukan sahaja daripada penduduk tempatan tetapi telah mendapat perhatian pencinta alam seluruh dunia. In ialah kerana pembinaannya akan memusnahkan kira-kira 173,000 hektar kawasan hutan yang akan ditenggelami dan menjejaskan sistem ekologi di kawasan yang berkenaan. Akibatnya, hutan dan tumbuhan serta tanaman terpaksa dilenyapkan dan banjir besar-besaran boleh berlaku apabila empangan itu pecah.

Saiz empangan ini lebih kurang kepulauan Singapura, dengan ini kita dapat menjangka kesan pembinaan yang boleh membawa kepada kepupusan binatang dan haiwan di dalam hutan. Kepupusan kehidupan liar dan unsur flora dan fauna akibat penebangan hutan akan menjejaskan tarikan kedatangan pelancong asing ke negeri Sarawak. Secara tidak langsung, pembinaan empangan tersebut juga akan menjejaskan pendapatan dalam industri pelancongan di negeri Sarawak.

Dalam projek ini, lebih kurang 10,000 orang asli yang terdiri daripada suku kaum Kenyah, Kayan, Lahanan, Ukit, dan Penan terpaksa dipindahkan. Ini bukan sahaja akan menimbulkan masalah penempatan semula penduduk peribumi di Sarawak tapi juga akan menjejaskan sumber ekonomi mereka yang kebanyakannya masih bergantung pada hasil hutan.

Projek Hidroelektrik Bakun ini jika siap dibina , dijangka membekalkan tidak kurang ¼ keperluan tenaga di seluruh Malaysia. Jumlah aliran tenaga elektrik ialah 2,4000 megawatt. Secara umumnya, pembinaan empangan hidroelektrik akan menguntungkan ekonomi negara kerana pembekalan kuasa hidroelektrik akan mendatangkan RM3.5 bilion hasil kepada negara.

Projek Hidroelektrik Bakun merupakan satu projek besar yang sepatutnya dirancang oleh kerajaan pusat secara teliti. Projek ini sememangnya penting dalam konteks pembangunan negara, namun kita tidak boleh mengetepikan kesan sampingan yang turut akan menjejaskan pembangunan negara dan kehidupan masyarakat. Tiada gunanya kita menegak benang yang basah semata-mata kerana tidak mahu melengahkan projek ini.

31. Kenapakah Projek pembinaan empangan di Bakun ditangguhkan?

a. Tentangan daripada penduduk tempatan dan pencinta alam seluruh dunia.
b. Masalah kemerosotan ekonomi dan tentangan daripada penduduk tempatan dan pencinta alam seluruh dunia.
c. Projek ini telah menjejaskan industri pelancongan dan pendapatan penduduk tempatan.
d. Projek ini perlu dipertimbangkan semula akibat tentangan daripada masyarakat dunia.

32.Bagaimanakah projek ini menjejaskan sistem ekologi di kawasan yang terlibat?

a. seluas 173,000 hektar kawasan hutan akan dimusnahkan bagi pembinaan empangan.
b. Flora dan fauna akan ditenggelami air.
c. Empangan akan pecah dan ini akan menjejaskan kestabilan ekologi tanah di kawasan tersebut.
d. Kehidupan liar dan flora dan fauna akan pupus dan ini akan menjejaskan sistem ekologi di kawasan yang terlibat.

33. Daripada perspektif kemasyarakatan, pilih Perkara-perkara yang perlu dipertimbangkan dalam meneruskan projek pembinaan empangan Bakun?

a. Masalah tentangan masyarakat tempatann dan gantirugi yang harus diberi kepada masyarakat peribumi.
b. alam sekitar dan pandangan masyarakat tempatan.
c. Bayaran elektrik yang lebih murah dan tidak menyusahkan masyarakat.
d. Masalah penempatan semula kaum peribumi dan penyesuaian kaum peribumi dalam menghadapi kehidupan baru.

34. Jelaskan bagaimana projek ini boleh menguntungkan dari segi ekonomi?

a. Bekalan tidak kurang dari ¼ keperluan tenaga rakyat Malaysia dan mendatangkan RM 3.5 milion hasil.
b. Mendatangkan sebanyak RM 3.5 milion hasil pada negara.
c. Bekalan kuasa hidroelektrik akan mendatangkan RM 3.5 bilion pada negara.

d. Bekalan kuasa hidroelektrik akan membekalkan tidak kurang ¼ keperluan tenaga seluruh Malaysia dan mendatangkan RM 3.5 bilion hasil untuk negara.

35. Apakah faktor-faktor yang sepatutnya dipertimbangkan oleh kerajaan pusat sebelum melaksanakan projek ini?

a. Masalah alam sekitar dan pandangan masyarakat global dan tempatan.
b. Masalah alam sekitar dan kesan sampingan projek tersebut terhadap kehidupan masyarakat tempatan.
c. Sistem ekologi dan pandangan pencinta alam sekitar.
d. Impak projek tersebut terhadap alam sekitar dan masyarakat tempatan, masalah penempatan semula serta pulangan hasil projek tersebut dari segi jangka panjang.

Antara langkah awal yang perlu dilaksanakan untuk membina masyarakat madani adalah dengan melahirkan individu yang berbudi pekerti mulia. Mereka mestilah menghayati nilai kehidupan yang murni dan berjuang untuk keadilan. Individu yang dilahirkan juga mestilah berusaha menggembleng kepakaran masing-masing dalam usaha memajukan diri dan masyarakat. Mereka juga mesti mengikis sikap mementingkan diri yang melampau. Sebaliknya mengutamakan matlamat bersama. Kesejahteraan masyarakat madani tidak boleh dirujuk kepada kemakmuran ekonomi, keselesaan hidup, kemajuan teknologi dan kecanggihan prasarana semata-mata, sebaliknya merangkumi keharmonian dan kerukunan hidup bermasyarakat.

Dalam masyarakat madani, idealisme kesejahteraan wujud sebagai fenomena yang dihayati bersama, dan bukan sebagai retorika yang ilusif. Berdasarkan rasional ini, masyarakat madani perlu ditunjangi oleh suatu sistem nilai yang kondusif serta berasaskan prinsip moral yang menjamin keseimbangan antara kebebasan individu dengan keadilan masyarakat. Kemewahan dalam sistem sosial yang tidak adil, pada bila-bila masa dan dalam apa jua keadaan tidak akan mewujudkan masyarakat madani. Usaha membangunkan masyarakat madani juga tidak akan berhasil jika tidak diasaskan pada undang-undang yang adil. Undang-undang yang menindas akan hanya mewujudkan kebimbangan dan ketakutan. Dalam keadaan yang melampau, ia boleh mewujudkan huru-hara.

Untuk menjamin keadilan, setiap ahli masyarakat perlu diberi penerangan yang tuntas tentang undang-undang yang digubal. Dengan penerangan yang mantap

sahaja seseorang, warga awam bersedia menghormati dan menghayati undang-undang. Individu yang buta undang-undang tidak boleh dipertanggungjawabkan membina masyarakat madani, apatah lagi jika mereka tidak memahami sumbangan yang dituntut ke atas mereka. Dalam realiti masyarakat madani, keadilan yang berfungsi bukan sahaja keadilan formal, tetapi juga keadilan dalam bentuk membuat keputusan. Dengan itu, konsep keadilan perlu dihayati dan dilaksanakan dengan prinsip demokrasi, bukan sahaja dalam domain politik, tetapi juga dalam aspek kehidupan yang lain termasuklah ekonomi dan pendidikan.

Setiap anggota masyarakat madani juga pelu bersedia memperlengkap diri dengan keperluan untuk mengamalkan konsep syura;. Aplikasi konsep ini akan lebih berkesan apabila setiap warga berpeluang menyumbang pendapat secara formal mahupun secara separa formal. Mungkin dalam hal ini, media massa dan pertubuhan bukan kerajaan (NGOs) boleh memainkan peranan penting dan bersama-sama memikul tanggungjawab. Jika ini dapat dilakukan, kewujudan masyarakat madani yang kita inginkan akan menjadi kenyataan.

36. Berikan definisi masyarakat madani.
    a. Adil, bekerjasama, berakhlak mulia dan berkongsi kemahiran.
    b. Mementingkan pendidikan sekular dan agama.
    c. Mementingkan akhlak dan kesamarataan.
    d. Mengamalkan konsep syura.

37. Jelaskan asas-asas yang penting dalam menunjangi masyarakat madani?
    a. sistem kepercayaan yang kondusif dan mementingkan konsep syura.
    b. Sistem nilai yang kondusif dan prinsip moral mementingkan keseimbangan antara kebebasan individu dengan keadilan masyarakat.
    c. Keadilan dalam membentuk membuat keputusan dan menghayati sistem perundangan yang sedia ada.
    d. idealisme Kesejahteraan yang dihayati bersama.

38. Kenapakan keadilan itu penting dalam merealisasikan masyarakat madani?
    a. Untuk mengelakkan kebimbangan dan hura-hara di kalangan rakyat.
    b. Untuk mengaplikasikan konsep syura dan demokrasi.
    c. Untuk mewujudkan kestabilan masyarakat, politik ,ekonomi dan pendidikan.

d. Untuk mewujudkan sistem perundangan dan individu yang menghayati undang-undang.

39. Bagaimanakah konsep syura itu berperanan dalam merealisasikan masyarakat madani?

a. Pihak NGO turut berpeluang menyuarakan hak masing-masing.
b. rakyat berpeluang untuk menyuarakan pendapat secara formal dan separa formal.
c. Setiap rakyat berpeluang menghayati sistem perundangan yang adil.
d. Setiap rakyat berpeluang membuat keputusan dalam pelbagai aspek kehidupan.

40. Pada pendapat anda, apakah wahana penting dalam pembentukan masyarakat madani?

a. Aplikasi konsep syura
b. Sistem undang-undang yang adil.
c. Amalan prinsip moral.
d. Pendidikan

Petikan 9

Orang purba, khususnya orang Yunani dan Rom Zaman awal Republik menulis frasa-frasa terpilih untuk membela hak kebebasan bersura. Demosthenes misalnya menyatakan bahawa tidak ada malapetaka yang lebih besar yang melanda manusia kecuali "penafian kebebasan bersuara". Tetapi tidak ada bukti bahawa walau dalam zaman libetarian, pendapat dapat dinyatakan secara lisan atau tulisan dengan pengecualian tanpa sebarang sekatan. Plato bercerita bagaimana Socrates dihukum oleh Athens yang mencintai keamanan kerana menuturkan kata-kata subvesif. Dan Plato sendiri adalah pemuka penapisan. " Penyair mestilah tidak mengarang sesuatu yang bertentangan dengan ide-ide yang sah, atau adil, atau indah, atau baik, yang dibenarkan menunjukkan karangannya kepada orang lain sehinggalah dia menunjukannya terlebih dahulu kepada penapis yang dilantik dan pengawal undang-undang mereka yang berpuas hati terhadapnya.

Lagi pula, sifat asas kebebasan pernyataan fikiran telah diakui oleh banyak masyarakat di sepanjang zaman. Misalnya, undang-undang kazakh pada abad ke 15

menyatakan bahawa kita boleh memancung kepala seseorang tetapi lidahnya tidak boleh dipotong.

Penapisan, termasuklah penapisan sendiri selalu dianggap sebagai sebahagian proses kebebasan bersuara yang dapat diterima, bukan sebagai musuhnya. Machiavelli menerangkan sikap zaman pembaharuan apabila dia memberi hak setiap orang untuk "berfikir tentang semua perkara, bercakap untuk semua benda, menulis segala-galanya, tetapi ada etikanya."

Perjuangan mendapatkan kebebasan pernyataan dan informasi tidak seperti hak asasi lain adalah berkait rapat dengan perkembangan teknologi, sama seperti perubahan budaya – perkembangan yang mendorong penapisan semakin meningkat apabila kebebasan semakin meningkat dan diperjuangkan. Penapisan ini dianggap penting jika kebebasan pernyataan dan informasi boleh membawa kepada keruntuhan.

Kawalan negara terhadap media massa untuk tujuan peperangan dan propaganda bangsa adalah antara ciri pelanggaran hak kemanusiaan semasa Perang Dunia Kedua. Namun begitu, informasi yang sengaja direka, disekat dan dipalsukan telah sedikit sebanyak mempercepatkan tamatnya perang dan menegakkan pihak yang benar dalam Perang Dunia Kedua. Selepas Perang Dunia kedua, Perisytiharan Sejagat Tentang Hak Asasi Manusia 1948 dilancarkan dengan mukadimahnya berbunyi "manusia mestilah menikmati kebebasan bersuara dan berkepercayaan serta kebebasan daripada ketakutan dan kemiskinan." Pada tingkat yang ekstrim, penapisan mengancam hak untuk hidup. Kadangkala ia merupakan ancaman langsung apabila pembunuhan digunakan sebagai sekatan terhadap mereka yang bersuara. Ada banyak cara lain untuk membunuh melalui penapisan. Jutaan kematian akibat kebuluran dikaitkan dengan penutupan maklumat secara sengaja. Apabila ditutup suara-suara bantahan, masyarakat antarabangsa tidak akan dapat bertindak balas terhadap kesengsaraan mereka dalam waktu yang pendek.

41. Apakah maksud ungkapan "Penyair mestilah tidak mengarang sesuatu yang bertentangan dengan ide-ide yang sah, atau adil, atau indah, atau yang baik yang dibenarkan di negeri"

    a. Hasil karya sasterawan harus ditapis untuk mengawal pengaruh mereka ke arah yang negatif

b. Sasterawan haruslah menulis berdasarkan suara rakyat dan tepat pada makna sebenar sastera

c. Penulisan sastera harus dikawal berdasarkan keadilan dan keindahan yang sebenarnya.

d. Kebebasan bersuara harus tidak terpesong daripada landasan etika dan kebenaran

42. Mengikut penulis, siapakah yang menyokong kawalan terhadap kebebasan bersuara dalam petikan di atas?

a. Demosthenes dan Plato

b. Machiavelli dan Socrates

c. Plato dan Socrates

d. Plato dan Machiavelli

43. Apakah kesan yang mungkin timbul jika kebebasan bersuara disekat?

a. Bantuan kemanusiaan kepada mangsa bencana mungkin tidak dapat dihulurkan dalam masa yang singkat.

b. Masyarakat antarabangsa tidak dapat bertindak balas terhadap kesengsaraan dalam waktu yang singkat dan pihak yang menyekat kebebasan akan mencapai kepentingan mereka

c. Proses bantuan kepada mangsa kesengsaraan tidak dapat dilaksanakan dengan cepat, pembunuhan yang berterusan dan keuntungan kepada pihak yang menyekat kebebasan.

d. Rusuhan yang berlaku ekoran daripada ketidakpuasan hati rakyat dan ini secara tidak langsung menyebabkan pembunuhan dan kebuluran.

44. Berdasarkan pengetahuan anda, kenapakah penapisan itu penting?

a. Kerana ia adalah berkait rapat dengan proses kebebasan yang dapat diterima.

b. Kerana kebebasan bersuara semakin berleluasa.

c. Apabila kebebasan pernyataan dan informasi boleh membawa kepada Keruntuhan.

d. Apabila kebebasan bersuara memberi haksetiap orang untuk berfikir tentang semua perkara, untuk semua benda dan menulis segala-galanya.

45. Kenapakah penulis menyatakan bahawa penapisan boleh mengancam hak untuk hidup?

a. Penutupan maklumat secara sengaja menyebabkan kebuluran dan pembunuhan secara tidak langsung kerana masyarakat antarabangsa tidak dapat membantu mereka yang berada dalam kesengsaraan.

b. Pembunuhan digunakan sebagai sekatan terhadap mereka yang bersuara.

c. Pembunuhan sebagai sekatan terhadap hak bersuara dan penutupan maklumat secara sengaja mengakibatkan kebuluran serta kelambatan pihak antarabangsa menghulurkan bantuan kepada mereka yang menghadapi kesengsaraan.

d. Pembunuhan berlaku semasa rusuhan untuk mendapatkan hak bersuara dan penutupan makluamat secara sengaja mengakibatkan kelambatan pihak antarabangsa menghulurkan bantuan kepada mereka yang menghadapi kesengsaraan.

Petikan 10

Teknologi pengkomputeran melibatkan alat elektronik atau mesin yang canggih untuk menghasilkan maklumat atau data yang diperlukan dalam urusan seharian. Umumnya, teknologi pengkomputeran adalah lambang era siber/MSC serta lambang pembangunan dan kemajuan. Komputer memainkan peranan penting dalam pelbagai bidang; ekonomi, pentadbiran, kejuruteraan, perubatan, pendidikan mahupun kemanusiaan dan kemasyarakatan.

Komputer penting dalam pelbagai kegiatan ekonomi. Misalnya urusan harian di dalam sektor perbankan atau institusi kewangan:menyimpan dan mengeluarkan wang menerusi kad ATM: pembayaran (bil telefon,eletrik,air dan cukai pendapatan)di kaunter pelbagai perkhidmatan:urusan pentadbiran dan pemprosesan dokumen seperti yang terdapat di Jabatan Pengangkutan Jalan Raya,Jabatan Imigresen, Jabatan Perangkaan Malaysia dan sebagainya.

Teknologi pengkomputeran memudahkan penyebaran dan penyimpanan maklumat: segala maklumat penting dapat disimpan secara mudah dalam CD,internet dan sebagainya. Pelbagai jenis maklumat juga dapat diperoleh menerusi saluran canggih dalam komputer. Akibatnya, dunia menjadi semakin kecil kerana penyebaran maklumat dapat dilakukan secara pantas dan meliputi seluruh dunia.

Dalam urusan pendidikan dan penyelidikan pula, komputer telah manjadi alat yang begitu penting bagi penyelidik dan pendidik. Komputer dapat digunakan sebagai agen mengajar yang moden dan canggih. Pengajaran dan pembelajaran manjadi semakin menarik (menerusi computer Assisted Learning); mempercepatkan pemprosesan keputusan peperiksaan oleh pihak kementerian Pendidikan Majilis Peperiksaan Malaysia dan untuk mengendalikan Pendidikan Jarak Jauh: telekonferens dan video. Dalam bidang penyelidikan pula, komputer boleh digunakan untuk kajian dan ramalan cuaca, kawalan lalu lintas, penerokaan angkasa lepas, penyelidikan tenaga nuklear dan lain-lain.

Walaupun kemajuan dalam teknologi pengkomputeran didakwa telah menyebabkan peluang pekerjaan semakin berkurangan, sebaliknya pekerjaan dalam bidang pengkomputeran semakin meningkat. Contohnya jurutera komputer, juruanalisa system, operator, pengaturcaraan, juruteknik servis serta aktiviti –aktiviti hiliran yang lain.

Akibat daripada kemudahan dan kenikmatan yang diperoleh daripada teknologi ini, kebanyakan pengguna sudah ketagih dan terlalu bergantung pada komputer dalam pekerjaan ataupun perhubungan. Kesibukan seseorang dengan komputer, serta interaksi menerusinya menyebabkan gejala pemencilan diri dan kurang hubungan bersemuka. Malah penagih komputer mengakibatkan suami mengabaikan isteri, anak-anak serta tanggungjawab keluarga di rumah.

Penggunaan komputer yang terlalu kerap dan lama boleh merosakkan mata pengguna komputer kerana pendedahan langsung kepada sinar radioaktif dan sebagainya. Sistem saraf turut terganggu dan ini akan menjejaskan kesihatan kita. Dengan kata lain, penggunaan komputer yang berlebihan boleh menjejaskan kesihatan mental.

Penyalahgunaan komputer bagi tujuan politik dan sebagainya juga membimbangkan. Sesetengah pihak yang tidak bertanggungjawab telah menggunakan media ini untuk menyebarkan maklumat keselamatan dan ketenteraan negara, menyebarkan khabar angin untuk menjatuhkan pihak-pihak tertentu. Apa yang lebih membimbangkan lagi ialah penyebaran maklumat yang berunsur lucah dan ganas melalui internet. Program/bahan internet yang membawa perlakuan yang tidak bertanggungjawab, jenayah kolar putih dan juga jenayah lain seperti merogol, mencuri dan merompak. Ini secara tidak langsung boleh merosakkan akhlak dan

moral masyarakat . Malah penggunaan komputer yang berlebihan boleh membeku atau membantut daya inovatif, kreativiti , dan keupayaan berfikir manusia.

Penggunaan teknologi komputer dalam pembangunan negara sememangnya penting. Walau bagaimanapun, kawalan yang sesuai harus dirancang untuk mengelakkan penyalahgunaan komputer agar teknologi pengkomputeran dapat mambawa manfaat besar dari segi perubatan, social, ekonomi mahupun politik.

46. Kenapakah Pengarang menyatakan bahawa Komputer merupakan lambang Pembangunan negara?

a. Komputer memainkan peranan penting dalam pelbagai bidang; ekonomi, pentadbiran, kejuruteraan, perubatan, pendidikan mahupun kemanusiaan dan kemasyarakatan.

b. Teknologi pengkomputeran melibatkan alat elektronik atau mesin yang canggih untuk menghasilkan maklumat atau data yang diperlukan dalam urusan seharian.

c. Teknologi pengkomputeran adalah lambang era siber/MSC

d. Dalam bidang penyelidikan pula, komputer boleh digunakan untuk kajian dan ramalan cuaca, kawalan lalu lintas, penerokaan angkasa lepas, penyelidikan tenaga nuklear dan lain-lain.

47. Jelaskan maksud "dunia semakin kecil" dalam perenggan 3 di atas?

a. Pelbagai jenis maklumat juga dapat diperoleh menerusi saluran canggih dalam komputer.

b. Penyebaran maklumat dapat dilakukan secara pantas dan meliputi seluruh dunia.

c. Masyarakat dunia merasa dekat walaupun jauh.

d. Masyarakat dunia mudah berjumpa antara satu masa lain dalam masa yang singkat.

48. Bagaimanakah teknologi ini boleh menjejaskan interaksi sosial?

a. Pengguna sudah ketagih dan terlalu bergantung pada komputer dalam pekerjaan ataupun perhubungan.

b. Kesibukan dan interaksi menerusi komputer dan kurang hubungan bersemuka.

c. Penagih komputer mengabaikan isteri, anak-anak serta tanggungjawab keluarga di rumah.

d. Pengguna komputer sudah berpuas hati dengan hubungan elektronik.

49. Bagaimanakah komputer boleh menjejaskan kesihatan manusia?

a. Penggunaan komputer yang terlalu kerap dan lama boleh merosakkan mata pengguna komputer kerana pendedahan langsung kepada sinar radioaktif dan sebagainya.

b. Penggunaan komputer yang terlalu kerap dan lama boleh mengganggu sistem saraf dan ini akan menjejaskan kesihatan kita.

c. Penggunaan komputer yang berlebihan boleh menjejaskan Psikologi.

d. Pendedahan langsung kepada sinar radioaktif dan sebagainya boleh merosakkan mata pengguna dan mengganggu sistem saraf menyebabkan kesihatan mental terjejas.

50. Bagaimanakah teknologi pengkomputeran boleh membekukan daya kreativiti pelajar dan keupayaan berfikir pelajar?

a. Komputer dapat digunakan sebagai agen mengajar yang moden dan canggih sehingga pelajar tidak mempedulikan ajaran guru.

b. Pengajaran dan pembelajaran manjadi semakin menarik (menerusi computer Assisted Learning) sehingga pengajaran guru semakin membosankan.

c. Pelajar terlalu bergantung pada program komputer untuk mencipta dan tidak boleh menggunakan daya pemikiran sendiri untuk membuat apa-apa inovasi.

d. Pelajar terlalu didedahkan dengan program yang berunsur ganas dan negatif sehingga pelajar mengabaikan tugas dan pelajaran mereka.

Appendix E.2 (Comprehension: Post-test)
Ujian Pemahaman 2

Petikan 1

Nilai Ilmu

'. . . Nasihat. Adapun ilmu dan kepandaian itu menjadi tangga kepada pangkat kekayaan dan kekayaan itu membawa kepada kebesaran. Maka bahawasanya segala benda yang dijadikan Allah dalam dunia ini, masing-masing adalah dengan harganya, iaitu dapat dinilaikan oleh manusia;melainkan ilmu itulah sahaja yang tiada ternilai oleh manusia akan harganya. Dan lagi pula adapun harta dunia dan kekayaannya dan kebesarannya itu durjana adanya;seperti perempuan jalan berpinda-pindalah ia kepada barang sipa yang dikehendakinya, tetapi ilmu itu bukan demikian;teramat teguh setianya dan lagi bercahaya warna mukanya. Ia itulah sebaik-baiknya tolan orang yang berbudi adanya. Maka jikalau sekiranya bercerai nyawa daripada badan, maka pada waktu itulah ia pun bercerai daripadanya. Syahadan lagi, adalah iaitu kejadian yang amat ajaib dijadikan Allah;hairan, tiada ia dimakan ulat dan tiada ia rosak dalam hujan panas dan tiada pula ia dapat diambil pencuri dan tiada ia menyusahkan atau memberatkan kita memikul akan dia dan tiada ia menyesakkan tempat kita dan tiada pula ia meminta makan atau minum, melainkan barang bila dikehendaki adalah dia sedia . Maka sebab itulah kata arif:apabila engkau dapat wang, belikan emas;maka jualkan pula emas tiu, belikan intan;maka jualkan pula intan itu, belikan manikam;jualkan pula manikam itu, belikan ilmu. Maka demikianlah besar kemuliaannya itu serta dengan teguh setianya kepada orang yang mendapat dia itu. Maka barang berapa berat yang ditanggungkan diatasnya, ditahannya juga. Maka jikalau sekiranya terlampau daripada adat beratnya, remuklah ia, patah sekali;tetapi tiada ia tahu melentur atau bengkok seperti tiang kayu dan sebagainya.

Sebermula, maka apabila aku terkenang-kenang akan palu dan sesah dan tampar dan aki dan beberapa papanluluh yang pecah di kepalaku dan rajuk dan masam muka dan tengking herdik segala guruku itu;adapun satu-satu bilar rotan di atas tubuhku tatkala belajar itu sekarang ini menjadi satu suluh adanya dan satu-satu tampar itu menjadi cermin mata kepadaku pada masa ini. Maka jikalau ssekiranya tiada suluh itu di tanganku dan cermin mata itu kupakai, nescaya banyak kali sudah terperusuk ke dalam lembah dan parit yang penuh pada tiap lorong dan jalan;seperti kecuali kebanyakan kelakuan orang yang tiada memegang suluh itu terperusuk ia ke sana kemari, jatuh bangun, coreng-moreng, berlumur dengan lumpur dan arang dan patah riuk kakitangan di hadapanku. Maka adalah kupohonkan kepada Allah, kalau dengan mudah-udahan-Nya, diberi-Nya beribu-ribu rahmat dan selamat sejahtera dengan kebajikan guru-guruku yang telah menyedarkan aku daripada terperusuk itu;serta pula diberinya batu uji di tanganku, supaya tiada boleh aku terkena emas lancungan atau perak lancungan dan intan disangkakan batuu kelikir. Maka kebanyakan kecualinya orang yang tiada berbatu uji itu, terkena perkara yang demikian itu, tiada saksi yang menunjukkan baik jahat atau salah benarnya. . '

Daripada Hikayat Abdullah
(Disesuaikan kepada sistem ejaan baru)
Razak Mamat dan Dr. Hussain Mohammed, Strategi Menjawab Soalan Pengajian Am, Kertas 1 & 2,

Longman Malaysia Sdn Bhd,
Ms. 32-33

1 Apa yang dimaksudkan oleh Abdullah Munsyi '. kekayaan itu membawa kepada kebesaran. 'ialah

A Kekayaan boleh menyebabkan manusia hidup mewah
B Harta benda menyebabkan manusia menjadi angkuh
C kemewahan hidup menjadikan manusia bertubuh gemuk
D Kekayaan boleh meningkatkan martabat sosial manusia
E Manusia yang kaya boleh mencapai hidup mewah

2 Kedudukan 'ilmu dan kepandaian' bagi Abdullah Munsyi adalah

A boleh diperolehi oleh sesiapa pun
B sama mahalnya dengan emas dan intan berlian
C tiada ternilai harganya
D boleh dibeli dengan wang ringgit
E boleh musnah pada bila-bila masa

3 Mengapa Abdullah Munsyi melihat segala perbuatan kasar gurunya dahulu menjadi 'suluh' dan 'cermin mata'nya kepadanya
A Beliau adalah pelajar yang terlalu lembap
B Garangnya sikap guru-guru zaman dahulu
C Beliau terpaksa bersusah payah belajar
D Sukarnya mendapat ilmu yang amat berguna padanya
E Ingin memaafkan perbuatan kasar gurunya itu

4 Bagi Abdullah Munsyi, Ilmu yang dianggap 'suluh'dan 'cermin mata'nya itu menjadi alat terpenting untuknya kecuali

A mencapai kesenangan dalam hidupnya
B mengelakkannya terhumban ke lembah maksiat
C menghindarkannya melakukan kerja-kerja mungkar
D membolehkan beliau menjadi guru yang garang dan berani menghadapi karenah murid-muridnya
E membolehkan beliau menjadi penulis ulung

5 Nasihat penting Abdullah Munsyi dalam catatannya itu ialah
A murid-murid perlulah menghormati guru
B jika tidak dirotan bukan murid namanya
C setiap guru wajib bersikap garang
D cara mengajar yang berkesan ialah dengan kaedah yang keras dan ketat
E ilmu sukar diperolehi tetapi tetap berguna

Petikan 2-

Bahaya Makan Berlebihan

'. . . Sungguhpun maksud sebenarnya adalah makanan yang sempurna dan seimbang , namun istilah 'On diet' atau'diet'seringkali dimaksudkan sebagai mengurangkan makan makanan yang menggemukkan badan dan biasa juga bertujuan untuk memelihara kecantikan bentuk badan.

Penyediaan makanan yang seimbang dan sempurna haruslah mengambil kira akan faktor umur, pekerjaan, berat badan dan juga jantina. Kanak-kanak umpamanya lebih memerlukan makanan berprotein bagi tujuan membesar;sementara pekerja seperti buruh lebih memerlukan makanan yang memberikan tenaga yang lebih daripada makanan seorang kerani.

Selain itu , pengetahuan tentang kelompok makanan juga perlulah diberi perhatian kerana ini boleh menghindarkan bahaya penyakit tertentu seperti kencing manis, darah tinggi dan sakit jantung. Empat kelompok makanan utama iaitu susu, daging, bijirin dan sayur-sayuran serta buaha-buahan dan juga air seharusnya diambil dalam keaadaan seimbang berdasarkan keempat-empat faktor penyediaan makanan di atas.

Biasanya kesihatan yang buruk diakibatkan oleh makanan yang idak seimbang. Makanan yang banyak mengandungi karbohidrat iaitu bijirin seperti nasi, gandum dan roti tidak penting untuk tujuan membesarkan badan dan membina ketahanan badan daripada serangan penyakit, sementara kalau yang berlebihan lemak dan gula boleh menyebabkan penyakit-penyakit tertentu pula.

Misalannya, garam dan sodium klorid yang diambil berlebihan didapati mendatangkan bahaya-bahaya tertentu seperti tekanan darah tinggi, barah dan sakit urat saraf. Sementara jika berkeadaan berlebihan asid, boleh pula menyebabkan penyakit-penyakit tertentu seperti borok, 'stomach ulcer' dan sakit sendi-sendi.

Penjagaan kesihatan pada umumnya memerlukan pengetahuan yang baik serta kesedaran tertentu terhadap bahayanya makan makanan yang berlebihan dan tidak terkawal. Oleh itu, istilah 'diet'yang lebih tepat seharusnya dijadikan amalan dan matlamat penting dalam usaha penjagaan kesihatan dan penghindaran penyakit oleh sesiapa sahaja. . . '

Disesuaikan daripada Mohammad Bahadon,
Bahayanya Makan Berlebihan, Dewan Masyarakat. Sept. 1978
Razak Mamat dan Dr. Hussain Mohammed,
Strategi Menjawab Soalan Pengajian Am, Kertas 1 & 2,
Longman Malaysia Sdn Bhd,
M. s 42-43

6. Istilah 'diet' atau biasa disebut 'on diet' yang tepat bermaksud
A pantang larang makan makanan yang boleh menggemukkan
B pengambilan makanan terpilih, sempurna dan seimbang
C pengambilan makan yang terpilih dan berzat sahaja
D pengambilan makan dan sayur-sayuran segar sahaja
E pengurangan bahan karbohidrat dalam makanan

7. Salah satu pernyataan yang berikut adalah tepat tentang perlunya seseorang petani makan makan pemberi tenaga yang lebih daripada yang diperlukan oleh seseorang kerani.
A Petani menusahakan sendiri bahan makanan mereka
B Petani menggunakan tenaga dalam kalori makanan yang lebih untuk bekerja
C Kerani tidak perlu menggunakan tenaga sewaktu bekerja
D Petani selalunya daripada golongan lelaki
E Kerani perlu lebih berjimat menggunakan wang kerana biasanya mereka tinggal di kawasan bandar.

8. Beberapa penyakit berbahaya seperti darah tinggi boleh dielakkan dengan lebih berkesan sekiranya
A mengurangkan pengambilan gula dalam minuman
B mengurangkan penggunaan garam atau 'sodium klorida' dalam makanan
C menggantikan pengambilan garam dengan peraa makanan yang lain
Dmenggantikan garam atau'sodium klorida' dengan garam galian asli (daripada buah-buahan atau sayur-sayuran).
E melebihkan minum air setiap hari

9. Amalan pemakanan seimbang bertujuan untuk memenuhi keperluan
A pembesaran tubuh badan
B menambahkan tenaga
C mengelakkan penyakit-penyakit berbahaya seperti darah tinggi dan kencing manis
D mengimbangi saiz tubuh dengan usia dan rangka tubuh, jantina dan seumpamanya
E mempelbagaikan jenis makanan yang dimakan

10. Salah satu pernyataan yang berikut tidak tepat tentang penyakit-penyakit berbahaya seperti kencing manis dan darah tinggi.
A Semua orang terdedah kepada bahaya penyakit berkenaan
B Penyakit ini bersifat'semula jadi' dalam diri penghidapnya sendiri
C Penyakit ini boleh merebak dan berjangkit daripada seorang ke seorang yang lain
D Penyakit berkenaan sukar dicegah dan dielakkan
E Penyakit ini ada kaitannya dengan tabiat penghidapnya sendiri.

PETIKAN 3

Dilema Pembangunan Negara Dunia Ketiga

'. . . Banyak Negara Dunia Ketiga (NDK) selepas memenangi perjuangan mendapatkan kemerdekaan dalam tahun 1950-an dan 1960-an berusaha untuk memperteguhkan ekonomi mereka. Hasilnya di antara tahun 1960-an hingga 1970-an, pembangunan ekonomi di NDK mencapai suatu tahap yang dianggap boleh mengejar kemajuan negara-negara maju. Ramalan itu bukan disokong oleh kepentingan ideologi untuk meyakinkan NDK semata-mata, tetapi melalui pencapaian negara-negara yang baru merdeka. Purata pertumbuhan Keluaran Negara Kasar (KNK) bagi NDK dalam tempoh tahun-tahun 1960-an ialah 5. 6 peratus sementara dalam tahun 1970-an, purata pertumbuhan KNK mereka mencecah kepada 5. 8 peratus. Berdasarkan segi eksport pula, pencapaian NDK begitu menggalakkkan. Ini jelas terbukti pada tahun 1962 apabila 20. 6 peratus daripada keseluruhan eksport dunia datangnya dari NDK . Dalalm tempoh 10 tahun selepas itu, jumlah eksport NDK dari segi peratus dunia bertambah kepada 26. 1 peratus, berbanding dengan jumlah import NDK sebanyak 21. 8 peratus pada tahun 1962 menjadi 25. 1 peatus pada tahun 1982.

Bagaimanapun, cerita indah NDK itu tidak kekal lama. Keuntungan daripada eksport, mahupun KNK tidak kekal kerana kelemahan asas mereka dalam pelbagai bidang-ekonomi, sains, teknologi, budaya danpendidikan. Selain itu, satu keadaan yang sukar dikawal oleh NDK ialah pasaan dunia yang mengalami proses perubahan mendadak dan kadangkala sukar untuk disesuaikan dengan keadaan di NDK sendiri. Selain masalah politik, rasuah dan perebutan kuasa di setengah-setengah negara, masalah paling menonjol yang mencabar keunggulan NDK ialah semakin kurangnya hasil eksport, defisit perdagangan dari segi imbangan pembayaran serta keadaan pertumbuhan ekonomi yang semakin menurun. Malah, setengah-setengah negara pula menghadapi kadar pertumbuhan yang negatif. Kesannya, kini NDK sedang menghadapi hutang luar negara yang melebihi US$2600 bilion.

Contoh paling jelas bagi KNK ialah negara-negara di Afrika yang menghadapi masalah ekonomi sejak bermulanya dekad 1980-an. Soal pokok ialah bertambah besarnya jumlah penduduk. Walaupun KNK di benua Afrika pada tahun 1987, tetapi pendapatan per kapitanya menurun sebanyak 4. 2 peratus kerana pertambahan jumlah penduduknya. Sementara perangkaan rasmi hutang luar Afrika kini berada pada paras US$520 000 juta pada akhir tahun

1986, berbanding dengan sebanyak US$439 400 juta pada akhir tahun 1985. . Sekiranya aliran ekonomi Afrika seperti ini berterusan , jumlah hutang luarnya akan menjadi US$936 000 juta menjelang tahun 1990 dan meningkat menjadi US$1. 4 bilion satu dekad kemudiannya.

Keadan ekonomi di Amerika Latin menjadi lebih parah pada tahun 1988 berbanding dengan tahun 1987. KNK yang dialami oleh negara-negara di Amerika Latin hanya bertambah 0. 7 peratus berbanding dengan pertambahan mereka sebanyak 2. 5

peratus dalam tahun 1987. Pada asasnya pendapatan per kapita Amerika Latin juga merosot pada kadar 1. 5 peratus dan yang menyedihkan lagi, kejatuhan tersebut telah dialaminya sejak lima tahun sebelumnya iaitu dalam tempoh yang sama, hutang negara-negara berkenaan melebihi US$1. 4 bilion. . . '

Dipetik daripada 'Negara Dunia Ketiga:Di mana Maruahnya?
oleh Afzul Farouqi, Dewan Masyarakat, September 1989
Razak Mamat dan Dr. Hussain Mohammed,
Strategi Menjawab Soalan Pengajian Am, Kertas 1 & 2,
Longman Malaysia Sdn Bhd,
M. s 25-27

11. Pada keseluruhannya pernyataan-paernyataan yang berikut , kecuali satu, adalah menepati maksud petikan yang diberi.

A Negara-negara Dunia Ketiga (NDK) pernah dijajah
B Tingkat pembangunan ekonomi NDK pernah mencapai prestinasi yang tinggi
C Pembangunan ekonomi NDK tidak pernah dipengaruhi oleh kepentingan sesuatu ideologi politik
D NDK pernah menjadi negara sumber eksport dunia yang penting
E Prestasi pembangunan ekonomi NDK mengalami keadaan turun naik yang tertentu.

12. Salah satu yang berikut merupakan sebab kegagalan NDK mempertahankan prestasi pembangunan ekonominya.

A NDK sudah tidak lagi dijajah
B Peratus eksport dunia mengatasi peratus importnya
C Proses perubahan dalam pasaran ekonomi dunia
D Mendadaknya peratus pertumbuhan KNK bagi kebanyakan NDK
E Semua sebab di atas

13. Kadar pertumbuhan negatif seperti yang dialami oleh setengah-setengah NDK adalah terbukti apabila

A Terjadinya rasuah dan perebutan kuasa yang amat berleluasa
B Masalah politik menggugat prestasi ekonomi
C Hasil dalam negeri tidak lagi boleh dieksport
D NDK membuat hutang luar negara
E NDK perlu berhutang luar negara untuk menampung hasil dalam negeri

14. Salah satu sebab beberapa buah NDK mengalami kadar pertumbuhan ekonomi yang lembap, malahan negatif ialah

A Kekurangan sumber galian asli
B Pertambahan penduduk yang besar dan pesat
C Dasar perlindungan negara-negara maju
D Pertambahan hutang dari dalam dan luar negeri
E Penurunan hasil dalam negeri untuk tujuan eksport

15. Secara khusus, pertambahan penduduk yang tidak dapat diimbangi oleh kadar pertumbuhan
ekonomi menjejaskan kemajuan sosioekonomi sesebuah negara dari segi
A Pendapatan per kapita
B Pertambahan kilang-kilang industri
C Bilangan pelabur-pelabur asing
D Bilangan dan kadar guna tenaga
E Imbangan bayaran dan nilai import eksport

Petikan 4

Pantang Larang dalam Masyarakat Melayu

Masyarakat Melayu kaya dengan pantang larang di dalam kehidupan mereka sehari-hari. Walaupun kini amalan pantang larang tidak begitu dipedulikan, namun kalau dikaji, sebenarnya terdapat nilai-nilai dan tujuan-tujuan positif mengapa pantang larang tersebut diwujudkan.

Beberapa jenis pantang larang masyarakat Melayu masih subur dan rancak meniti dari bibir ke bibir masyarakat Melayu sendiri. Masyarakat Melayu adalah masyarakat yang begitu tinggi peradaban dan tatatertib kesopanannya. Apa sahaja tindakan dan kata-kata yang hendak diucapkan dilakukan dengan penuh berhati-hati. Tindakan yang akan menjatuhkan air muka seseorang secara terang-terangan dianggap tidak bersopan.

Cara yang paling terhormat menegur atau menyedarkan kesilapan yang dilakukan oleh seseorang ialah dengan menggunakan kata-kata kiasan. Ini bertujuan supaya sebarang teguran yang dibuat tidak akan menyakiti perasaan seseorang.

Kelembutan dan ketinggian budi pekerti masyarakat Melayu itu ketara apabila mereka menyampaikan pendidikan moral yang dilakukan secara lembut dan berdiplomasi. Menemplak dan menyakiti hati seseorang secara terang-terangan bukanlah sikap yang digalakkan. Keadaan ini memberi gambaran bahawa masyarakat zaman dahulu hidup dalam suasana aman damai serta beersefahaman.

Sekiranya pantang larang tersebut tidak dapat memberi pengajaran yang terdapat di sebaliknya, maka ia akan menjadi suatu penyakit yang akan melumpuhkan masyarakat. Masyarakat akan menjadi pasif dan pemikiran dan tindakan mereka akan menjadi statik. Mereka yang sentiasa disogokkan dengan kepercayaan-kepercayaan karut dan tidak logik itu akan sentiasa berada dalam kebimbangan yang menyebabkan setiap perlakuan mereka terbatas. Misalnya, memanjat pokok pisang dikatakan akan menyebabkan perut seseorang itu terbelah. Sebenarnya dikhuatiri bahawa pokok pisang itu akan tumbang dan pakaian itu pula akan kotor. Jelaslah di sini bahawa pantang larang yang berbentuk negatif akan merugikan individu, masyarakat dan negara.

Profesor Dr. Abu Hassan,
Proses & Prosedur
(M. s 62-64)

16. Pantang larang yang wujud di kalangan masyarakat Melayu adalah bertujuan untuk
A mengelakkan daripada tercetusnya sebarang persengketaan
B mendidik masyarakat supaya berbudi bahasa
C mengekalkan tradisi yang diwarisi sejak turun temurun
D menjamin kelicinan tugas
E disesuaikan dengan ajaran agama

17 Amalan pantang larang di kalangan masyarakat Melayu menggambarkan bahawa orang Melayu
A mempunyai peradaban dan tamadun yang tinggi
B berkebolehan berfikir secara simbolik
C lebih berdiplomasi dalam mendidik masyarakat
D tidak mahu menjatuhkan air muka orang lain
E tidak suka berterus terang dalam hal-hal yang tertentu

18. Pantang larang orang Melayu dapat membentuk sebuah masyarakat yang
A hidup bergotong royong
B hidup dalam suasana harmoni
C hidup secara kolektif
D dipengaruhi oleh kepercayaan karut
E berkeadaan statik dan pasif

19. Anggota masyarakat yang melanggar pantang larang akan
A dikeji oleh anggota masyarakat itu
B dipulaukan oleh anggota masyarakat itu
C memalukan ibu bapa kerana mereka dianggap tidak mendidik anak
D mendapat dosa
E dianggap tidak beradab

20. Pantang larang masyarakat Melayu akan lebih mendatangkan manfaat sekiranya ia diadakan untuk
A mewujudkan persekitaran yang aman
B mewujudkan nilai-nilai yang positif
C berfikir secara rasional
D mewujudkan kekuatan mental dan fizikal
E menjadi panduan berkelakuan baik

Petikan 5
Dilema dan Risiko Penggunaan Tenaga Nuklear

'. . . Tidak dapat dinafikan bahawa perhatian dunia terhadap tenaga nuklear terjebak dalam suatu dilema yang menuntut kebijaksanaan mereka bertindak. Ini kerana sungguhpun ia diketahui berguna tetapi dalam masa yang sama bahan-bahan nuklear itu juga menjadi ancaman yang maha besar bagi manusia. Inilah yang dapat dikesan sepanjang pengetahuan manusia berhubung dengan bahan tenaga ini. Ketika berlakunya krisis tenaga minyak didunia awal tahun 1970-an dahulu, para saintis terpaksa berusaha menilai kembali kegunaan nuklear sebagai salah satu daripada sumber dan bahan tenaga yang boleh menggantikan bahan alternatif kepada petrol.

Oleh itu , sungguhpun sebilangan negara hari ini berusaha untuk memajukan kelengkapan persenjataan dan pertahanan mereka dengan berlumba-lumba memiliki senjata nuklear bagi menggerunkan musuh-musuh mereka , namun tidak banyak negara yang benar-benar merasai akibat-akibat buruk tenaga nuklear itu. Apa yang terjadi di Chernobyl, Rusia pada 26 April 1986 bilamana reaktor nuklearnya meletup dan mengakibatkan terjadinya kerugian banyak harta dan nyawa hanayalah kesan yang cukup kecil akan bahayanya nuklear itu. Kemusnahan yang lebih besar dan jauh lebih besar daripada yang diakibatkan oleh bom atom dijangkakan terjadi sekiranya nuklear benar-benar digunaka untuk menghadapi musuh.

Kebimbangan dunia terhadap nuklear itu bukanlah sekadar kesan akut radiasi nuklear yang boleh membakar dan melecurkan manusia tetapi juga akan kesan kroniknya.

Kesan kronik pancaran nuklear boleh terjadi apabila kita terdedah kepada paras radiasinya yang luar biasa. Di Amerika Syarikat, paras radiasi yang melebihi 8000 pico-curies bagi satu kilogram makanan umum dan 1500 picicuries bagi satu kilogram makanan kanak-kanak dikira sudah mencapai paras berbahaya. Radiasi ini boleh dipancarkan oleh debu-debu daripada letupan reaktor nuklear.

Sepertimana yang berlak di Chernobyl itu, letupan reaktor tersebut telah menyebabkan udara di bandar tersebut dipenuhi oleh debu-debu nuklear. Debu-debu ini boleh tersebar luas oleh angin dan hujan. Radioaktif yang berpunca dari bandar ini telah dapat dikesan merebak ke beberapa tempat di Amerika Syarikat.

Debu-debu berkenaan boleh mengotorkan makanan dan air. Ia akan meresap ke dalam tubuh binatang ternakan sekiranya binatang ternakan tersebut minum air atau makan makanan dan daun-daun yang dikotori oleh debu-debu itu.

Sebenarnya radiasi nuklear, sama ada daripada pancaran X ataupun reaktor nuklear, mempunyai hubungan rapat dengan kejadian barah terutamanya leukimia, iaitu barah darah putih. Kejadian barah ini di kalangan penduduk bandar Hiroshima di Jepun memuncak kira-kira tujuh tahun selepas terjadinya letupan bom atom dalam Perang Dunia Kedua di bandar tersebut pada tahun 1945.

Namun begitu, tidak harus dilupakan bahawa mana-mana negara yang maju dalam bidang teknologi dan kelengkapan perangnya, termasuklah pemilikan dan pengetahuan tentang nuklear sama ada dalam bidang ketenteraan mahupun sains serta teknologinya adalah menjadi negara yang digeruni dan ditakuti. . . '.

Disesuaikan berdasarkan beberapa laporan akhbar tempatan 1986-90
Razak Mamat dan Dr. Hussain Mohammed,

Strategi Menjawab Soalan Pengajian Am, Kertas 1 & 2,
Longman Malaysia Sdn Bhd,
M. s 44-45

21. Salah satu pernyataan yang berikut adalah tepat tentang tenaga nuklear.
A. Tenaga nuklear bersifat memusnahkan
B Bahaya tenaga nuklear sukar dikawal
C Masih ada tenaga alternatif bagi tenaga nuklear
D Tenaga nuklear bersifat semula jadi
E Semua negara berminat untuk memiliki tenaga nuklear

22. Kesan radiasi nuklear boleh menyebabkan
A Kekotoran makan dan minuman
B Kemandulan
C Barah darah putih atau leukimia
D kebakaran pada jirim atau jasad
E peletupan bom

23. Perlumbaan senjata nuklear di kalangan negara-negara di dunia hari ini adalah terutamanya untuk tujuan
A kesihatan
B persenjataan dan pertahanan
C penerokaan angkasa lepas
D gantian tenaga petroleum
E pembangunan pertanian

24. Letupan nuklear terbar luas denga serta merta oleh kerana
A cepat tersebar melalui sistem telekomunikasi
B cepat tersebar melalui udara atau tiupsn angin
C cepat mendap di dalam air
D halaju sebaran bergantung pada saiz reaktornya
E mudah merebak melalui air hujan

25. Sungguhpun negara-negara yang memiliki tenaga nuklear digeruni dan ditakut, namun salah satu pernyataan yang berikut membimbangkan diri mereka sendiri
A Menjadi pembekal senjata paling maju dan mahal
B Memiliki pengetahuan tertinggi dalam persenjataan
C Sudah berupaya mencipta sistem pertahanan terbaik
D Memiliki sistem pertahan yang sukar dikalahkan
E Sentiasa terdedah kepada bahaya senjata sendiri

Petikan 6

Pengurusan Pertanian dan Perhutanan

'. . . Konsep pemulihan dan peningkatan mutu dan hasil merupakan asas penting dalam kegiatan pengurusan dan teknologi pertanian dan perhutanan hari ini. Umpamanya kawasan-kawasanhutan yang telah ditebang perlu diawet dan ditanam semula dengan pokok-pokok yang baru dan yang boleh mengeluarkan hasil yang lebih banyak. Pemulihan ini perlu disegerakan bagi mengelakkan terjejasnya sistem ekologi dan persekitaran secara besar-besaran dan tahan dalam masa yang lebih lama.

Demikian juga dalam bidang pertanian, apa pun jenis taaman yang ditanam dan dihasilkan, ia seharusnya ditanam semula dengan benih-benih yang lebih banyak dan menguntungkan.

Hampir selamanya kita beranggapan bahawa tanah, air dan bahan bakar atau tenaga didapati dengan murah dan dalam keadaan yang tiada had dan batasannya. Namun begitu, pengalaman menunjukkan bahawa penawaran bahan-bahan makanan dan keselesaan hidup pada masa-masa akan datang amat bergantung pada pengetahuan yang lebih saintifik yang memerlukan kerja-kerja penyelidikan tertentu yang berupaya untuk mengeluarkan hasil disebalik tanah , air dan tenaga yang terbuktiada had dan batasannya itu.

Sistem-sistem yang terhasil itu pu;a perlu mencapai tujuan asas bagi menampunng pertama-tamanya keperluan makanan manusia di samping berusaha melakukan pemeliharaan tanah. Usaha ini pastilah melibatkan gabungan pelbagai jenis tanaman dan giliran penanaman, penggunaan baja, pencegahan serangga, pengurusan sistem saliran srta sumber-sumber organik yang lainnya.

Sehubungan dengan inilah , teknik-teknik dalam pemindahan bahan genetik daripada satu jenis tanaman kepada jenis tanaman yang lain yang melibatkan pengurusan baka-baka terpilih dalam sistem biologi sesuatu tanaman. Misalnya dalam proses'nitrogen fixation' pada tumbuh-tumbuhan bukan kekacang iaitu kira-kira satu pertiga penggunaan bahan tenaga dalam kerja-kerja pertanian yang menggunakan baja kimia nitrogen itu dapat dijimatkan.

Sementara itu teknik pembiakan sel biologi molekular pula dapat menambahkan mutu bahan makanan. Teknologi ini membolehkan para saintis memelihara dan melindungi stok genetik tanaman seperti keledek, ubi kayu, kentang da pokok buah-buahan dengan memperbaiki pembiakan sel-sel dan tisu-tisu benih tanaman berkenaan. Benih-benih baru yang dihasilkan itu membolehkan tanaman berkenaan ditanam di tanah yang bermutu rendah yang mungkin selama ini kurang subur, berasid atau masin.

Demikian juga dalam proses fotosintsis bagi beberapa jenis tanaman sehingga dapat dibuktika bahawa ada tanaman seperti kacang tanah yang boleh memanfaatkan sehingga 12% tenaga suria dan seterusnya berupaya mengeluarkan hasil tiga kali ganda daripada pengeluaran biasa. Penyelidikan ini juga bermanfaat bagi menentukan pokok-pokok tanaman itu berupaya mengeluarkan komponen karbohidrat, protein, sera lemak yang seimbang dan bermutu tinggi. '

Disesuai berdasarkan beberapa laporan, rencana dan majalah pertanian tempatan

(Razak Mamat dan Dr. Hussain Mohammed,
Strategi Menjawab Soalan Pengajian Am, Kertas 1 & 2,
Longman Malaysia Sdn Bhd)
M. s 46-47

26. Pertimbangan utama dalam urusan pertanian dan perhutanan hari ini ialah
A meningkatkan mtu kayu yang diproses untuk dieksport
B mengurangkan penebangan pokok-pokok
C mengekalkan hutan belantara dalam keadaan yang asal
D memulihkan kawasan hutan seberapa segera yang boleh
E memperbesarkan kawasan hutan simpan

27. Kawasan hutan dan pertanian amat penting bagi mansia dalam memenuhi tujuan-tujuan yang berikut.
I Makanan
IIMinuman
IIIPakaian
IVPerlindungan
A I dan II
B III dan IV
C II dan IV
D I, II dan IV
E Kesemua di atas

28. Diantara yang berikut yang manakah dimaklumi mempunyai had dan batasan bekalan.
I Tanah
II Air
III Tenaga bahan api
IV Tenaga Suria
A I dan II
B II dan IV
C III sahaja
D I, II dan III
E Kesemua di atas

29. Salah satu yang berikut merupakan petunjuk kesedaran manusia dalam konteks pengurusan kawasan hutan dan pertanian
A Mempelbagaikan jenis tanaman
B Mempertingkatkan mutu tanaman
C Mempelbagaikan penyelidikan tentang perhutanan dan pertanian
D Menambahkan kawasan hutan dan pertanian
E Mengurangkan kesan sampingan ke atas kawasan hutan dan pertanian yang diterokai atau digunakan

30. Salah satu yang berikut adalah faedah langsung yang dihasilkan daripada teknik pembiakan sel biologi molekular.
A Meningkatnya jumlah hasil pertanian para petani
B Semakin luas kawasan tanah pertanian yang diperlukan
C Semakin kurangnya kawasan tanah terbiar

D Semakin krangnya kawasan tanah'kurang subur'yang teerbiar
E Semakin mudahnya kawasan hutan dibaik pulih

Petikan 7

Komunikasi Melalui Satelit

'. . . Pernahkah anda duduk di depan televisyen dan menyaksikan siaran langsung upacara solat Tarawih di Mekah atau perhimpunan di Padang Arafah ataupun perlawanan bola sepak Piala Dunia, Piala Eropah, Piala FA England atau perlawanan tenis, tinju dan seumpamanya?Tentu sahaja anda menjadi kagum kerana tanpa perlu bersusah payah membeli tiket kapal terbang untuk ke Mekah atau ke Rom atau ke London untuk berada dalam majlis-majlis berkenaan, anda masih dapat mengikuti dan menghayati apa yang disiarkan itu.

Inilah salah satu nikmat kemajuan sains dan teknologi hari ini. ini ialah teknologi komunikasi dan yang paling maju hari ini ialah teknologi satelit. Teknologi ini merupakan suatu stesen pemancaran imej jarak jauh melalui ruang angkasa yang boleh dihubungi oleh pelbagai 'pengguna'dan tempat sama ada di peringkat antara negara ataupun di dalam sesebuah negara itu sendiri.

Pada dasarnya sesebuah satelit itu hanyalah sekeping papan suis elektronik yang dilenglapi dengan alat-alat tertentu dan diorbitkan mengelilingi bumi. Pada kedudukan orbit yang khusus iaitu setinggi 35800 kilometer dari aras khatulistiwa bumi, sesebuah satelit yang diorbitkan akan dapat bergerak pada kelajuan yang sama tepatnya dengan putaran bumi. Pada kedudukan demikian, yang dinamakan sebagai 'orbit geostationary'itu, ia seolah-seolah sentiasa berada tetap dan tidak berganjak di angkasa. Melalui penggunaan antena dan peralatan komunikasi elektronik sewajarnya, satelit berkenaan boleh digunakan sama seperti telefon, televisyen, teleks dan faksimili diantara tempat-tempat yang boleh 'melihat'iaitu menerima pancaran maklumat satelit berkenaan.

Berdasarkan kemajuan teknologi komunikasi dan elektronik sejak kira-kira dua dekad yang lalu, satelit telah dapat mengatasi banyak rintangan tertentu dalam perhubungan manusia. Misalnya yang berkaitan dengan pemancaran langsung sesuatu upacara dan majlis seperti yang telah disebutkan. Malahan perhubungan dalam urusan perniagaan antarabangsa, pertukaran maklumat dan sebagainya lagi. Satelit merupakan kemajuan erbaru yang dicapai oleh manusia sehingga menjadikan dunia ini seolah-olah semakin kecil.

Sungguhpun begitu, tetap terdapat beberapa kelemahan dan masalah tertentu dala penggunaan dan kemajuan teknologi komunikasi satelit itu. Misalnya tidak semua negara mampu memilikinya sehingga menjadikan jurang negara kaya dengan negara miskin itu semakin luas. Kadangkalanya satelit digunakan juga untuk tujuan membuat intipan teerhadap negara musuh, terutamanya dari segi ketenteraan dan pertahanan. Malahan sebagai satu alat komunikasi yang canggih hari ini, satelit turut digunakan untuk tujuan mencari rahsia musuh dan menjadikan negara-negara lemah dan kecil semakin berasa terancam dan tidak selamat. . . '

Disesuaikan berdasarkan laporan akhbar-akhbar tempatan1990
Razak Mamat dan Dr. Hussain Mohammed,
Strategi Menjawab Soalan Pengajian Am, Kertas 1 & 2,
Longman Malaysia Sdn Bhd, M. s 50-52

31. Sungguhpun komunikasi satelit membantu perhubungan dan penyebaran maklumat yang serta-merta, namun sistem komunikasi jenis ini memerlukan
A sistem komunikasi angkasa lepas
B sistem komunikasi kelautan antarabangsa
C sistem komunikasi satelit domestik
D pemacar satelit bumi
E pelancar roket kapal angkasa

32 Perlunya sesebuah satelit angkasa lepas mengelilingi bumi adalah untuk
A mengintip pergerakan musuh
B menjadi alat perantaraan di antara bumi dengan bulan
C mengukur jarak bumi dan satelit lain
D menjalankan tugas perhubungan tempat-tempat di bumi
E memudahkan penerimaan maklumat dari bumi

33 Kedudukan 'orbit geostationary' sesebuah satelit akan membolehkan
A satelit mudah dihubungi dari bumi
B satelit sentiasa bergerak mengelilingi bumi
C Kelajuan dan jarak satelit dari buni sentiasa terkawal
D satelit menerima hantaran maklumat dari bumi
E satelit sentiasa berfungsi

34 Penciptaan satelit komunikasi dianggap semakin mengecilkan dunia kerana
A manusia dapat mengintip pergerakan musuhnya
B pengetahuan manusia sentiasa kemaskini
C bertambahnya bentuk dan acra manusia berkomunikasi
D manusia semakin mudah dan cepat berkomunikasi
E semakin banyak bencana yang boleh memusnahkan manusia

35 Salah satu pernyataan yang berikut menjelaskan perasaa kecewa negara-negara tertentu terhadap kemajuan komunikasi satelit.
A Negara pemilik satelit semakin dicurigai
B Pemilikan komunikasi terlalu mahal harganya
C Peralatan satelit boleh merenggangkan perhubungan di antara negara-negara tertentu
Dsesebuah negara pemilik menjadi semakin angkuh
E Kemajuan dan pemilikan satelit semakin menyebabkan manusia angkuh dan sombong

Petikan 8

Teh dalam Kebudayaan Cina

Orang Cina pada zaman dahulu memang pakar dalam penyediaan teh yang baik. Ia dianggap sebagai suatu seni menyediakan the pada hari ini tidak lagi diberi perhatian oleh orang Cina sekarang. Mereka tidak lagi mempedulikan tentang cangkir yang dipakai, jenis air dan juga cara yang digunakan untuk menyediakan the.

Pada zaman dahulu, orang Cina kuno amat cerewet . Mereka menggunakan jenis teh yang terbaik dan sangat berhati-hati semasa menyediakan teh. Mereka dipengaruhi oleh Luk Yik yang dianggap mereka sebagai "Dewa Teh".

Ada beberapa faktor yang menentukan kualiti teh, termasuklah air yang digunakan , daun-daun the dan cara penyediannya. Terdapat satu pepatah lama"Air adalah ibu teh-sekiraya tidak terdapat air yang baik, seseorang itu tidaka akan dapat menyediakan teh yang baik". Yang dimaksudkan dengan air yang baik ialah air larian dari mata air atau dari anak-anak sungai di gunung. Air itu sungguh bersih dan jernih. Ada pula setengah-setengah orang yang berfahaman kuno menggunakan air hujan yang telah dibersihkan dan disimpan untuk jangka masa yang lama bagi menyediakan teh. Pembersihan dijalankan dengan memasukkan arang yang masih membara dari dapur ke dalam air hujan yang dipungut tadi, dan kemudian mengeluarkannya dengan serta merta.

Sebelum memasukkan daun-daun the ke dalam cerek, cerek itu terlebih dahulu dibersih dan dibilas dengan air yang mendidih untuk memanaskannya. Selepas itu dimasukkan daun-daun yang hancur dan kemudian didikuti dengan semua daun teh yang lain. Air mendidih dituangkan ke dalam cerek itu dan "masakan yang pertama"ini dituangkan ke dalam cerek. Cerek itu kemudiannya ditutup dan air yang mendidih dituangkan secara perlahan-lahan ke atas cerek the supaya kepanasan di dalam cerek bertambah dan denga demikian dapat menghasilkan keharuman daun the yang segar.

Selain daripada peralatan dan penyediaan yang mengikut cara-cara tradisional, menuang dan meminum teh juga mempunyai seni yang tersendiri. Apabila menuangkan minuman tersebut ke dalam cawan yang kecil, cawan itu janganlah dipenuhkan satu demi satu tetapi sebaliknya hendaklah dituangkan sedikit-sedikit dengan agak pantas ke dalam setiap cawan hingga penuh. Semasa mengangkat cawan untuk meminum teh, hendaklah menggunakan ibu jari dan dua jari yang lain sahaja. Minuman tadi hendaklah diangkat ke hidung dahulu, kemudiannya barulah dihirup dengan perlahan semasa masih panas Ini adalah untuk mengekalkan rasa teh itu di dalam mulut. Dengan demikian, ini akan memberikan kepuasan sepenuhnya kepada peminum teh. Demikianlah caranya menikmati the Cina. Kenikmatannya bertambah apabila rakan-rakan peminum teh berkumpul berbual-bual sambil menikmati secawan teh.

Disesuaikan daripada Chinese Festivals oleh Lai Kuang Fook,
Heinemann Educational Books Ltd, 1984
Profesor Dr. Abu Hassan Othman dan Razak Mamat,
Pengajian Am, Proses dan Prosedur 2,
Longman Malaysia Sdn Bhd,
M. s 67-69

Soalan Aneka Pilihan

36. Apakah yang dimaksudkan dengan "ibu Teh"?

A Sesuatu yang melahirkan

B Elemen yang terpenting

C Bahagian yang besar

Dpanggilan yang hormat

E Bahan yang menjadikan teh

37. Semasa menuang teh, mengapakah cawan-cawan minuman itu tidak boleh dipenuhkan satu demi satu?

A untuk mengelakkan perbezaan kepanasan teh antara satu cawan dengan cawan yang lain

B keadaan sedemikian dianggap tidak berseni

Cuntuk mengimbangi kualiti dan keharuman the antara cawan yang dituangkan

D Untuk mengelakkan cawan yang terakhir daripada mengandungi hampas yang banyak

E untuk menjaga selera peminum

38. Mengapakah air perigi dianggap kurang sesuai untuk di gunakan bagi menyediakan the?

A Kerana airnya tidak mengalir

B Kerana airnya tidak sesuai untuk menghidupkan bau teh

C Kerana airnya pantang bagi Dewa Teh

D Kerana air perigi cepat sejuk dan tidak terasa kenikmatan teh

E Semua di atas

39. Kualiti teh yang baik ditentukan oleh perkara-peerkara yang berikut, kecuali

A jenis teh

B jenis cangkir

C air

D cara penyediaan

E cara meminum

40. Pada pendapat anda, mengapakah pengarang memasukkan pengaruh Luk Yik dalam petikan tersebut?

A Dewa Teh memberikan kenikmatan meminum the.

B Seperti benda-benda lain , teh juga mempunyai semangat

C Orang yang tidak menyediakan teh dengan betul dikutuk oleh Dewa Teh

D Teh adalah minuman keagaamaan

E Kesihatan badan peminum teh terjaga.

Petikan 9

Sejak tahun 1964, dua badan dunia , Organisasi Makanan dan Pertanian Antarabangsa (FAO)telah pun menganjurkan rancangan bersama bagi menggunakan teknik nuklear dalam bidang penyelidikan pertanian ke arah memperbaiki mutu dan pengeluaran hasil pertanian . Yang dimaksudkan dengan teknik nuklear ialah teknik yang menggunakan isotop radioaktif dan sinaran pengionan (seperti sinar gama dan sinar-X).

Rancangan penyelidikan itu boleh dibahagikan kepada enam perkara :1)Kesuburan tanah, pengairan dan hasil pengeluaran 2)Pembiakan tumbuhan dan baka, 3)Pengawalan serangan perosak, 5) Sisa bahan kimia dan pencemaran , dan 6) Pengawetan makanan. Dua daripada perkara ini dibincangkan di sini.

Dalam apa bidang pengeluaran sekalipun sekalipun kos adalah punca utama dan menjadi matlamat supaya kos pengeluarannya minimum. Jadi, bagi tujuan mendapatkan kuantiti dan kualiti tanaman sesuai dengan kos, faktor-faktor seperti kesuburan tanah, zat makanan, tanaman, pengairan dan cara melaksanakan perlu di pertimbangkan.

Dengan menyerapkan isotop radioaktif kepada zat makanan melalui baja yang diberikan, jumlah zat makanan yang diambil oleh tanaman boleh ditemtukan. Dengan kaedah ini juga kita bolehmembuat pilihan bentuk baja kimia yang sesuai, masa membubuh baja itu serta penggantian tanah, masa tumbuhnya tanaman dan suasana hawa. Hasil kajian ini tentunya dapat memperbaiki keberkesanan penggunaan baja.

Penggunaan alat sinaran neutron yang boleh mengukur kandungan wap air juga dapat menjimatkan masa, tenaga dan wang untuk menganggarkan perubahan profil air. Ini penting bagi tujuan pengairan yang sesuai, khususnya tempat-tempat di mana punca air terbatas. Teknik isotop radioaktif boleh juga digunakan untuk mengetahui pergerakan air.

FAO/IAEA telah pun menyelaraskan projek-projek mengesan keberkesanan baja fosforan dan nitrogen pada tanaman padi, gandum dan jagung serta ke arah membaiki keberkesanan penggunaan air kepada tanaman bijirin.

Teknik nuklear juga digunakan untuk mendapatkan baka yang mempunyai ciri yang sesuai seperti tahan penyakit, cepat matang dan sebagainya. Contohnya, kejayaan penggunaan teknik nuklear kepada sejenis padi yang ditanam di Hungary, Benihini, Cesariot, berasal dari Perancis. Cesariot memang sesuai ditanam di Perancis tetapi apabila di bawa ke Hungary di mana hawanya lebih sejuk, ia tidak mengeluarkan buah yang baik dan ada yang tidak berbuah langsung. Dengan , menggunakan teknik nuklear, benih ini telah disinari neutron dan kemudian ditanam. Baka yang berbuah cepat diasingkan dan diulangi penanamannya beberapa kali, dan akhirnya menghasilkan benih yang sama baiknya seperti induknya, malah cepat masak, kira-kira tiga minggu lebih awal.

Disesuaikan daripada "Teknik Nuklear Dalam Pertanian"oleh Dr. MD. Soot Ahmad Dewan Masyarakat, 15 Februari 1983.

(Atan Long, Pengajian am,
M. s 19-21,Penerbit Fajar bakti Sdn Bhd, 1987)

41. Teknik nuklear dalam pertanian ialah penggunaan
A. isotop radioaktif
B. sinaran pengionan
C. huraian (fission)
D. gabungan (fusion)
E. A dan B

42. Teknik nuklear tidak dapat mengurangkan kos pertanian dari aspek
A. mendapatkan kuantiti dan kualiti tanaman
B. mendapatkan kesuburan tanah
C. memperbaiki zat makanan pokok
D. pengairan tanaman
E. penuaian

43. Penyerapan isotop radioaktif kepada baja tidak mendatangkan faedah dari segi
A. menentukan jumlah zat makanan yang diambil pokok
B. membuat pilihan bentuk baja yang diperlukan
C. masa membubuh baja dan gantian tanah
D. masa tumbuhnya pokok
E pembubuhan baja

44. Penggunaan alat sinaran neutron dapat
A menganggarkan profil air
B mengadakan pengairan yang sesuai terutama di tempat-tempat yang kurang air
C menentukan pergerakan air
D A dan B
E A, B dan C

45. Padi jenis Cesariot
A mengeluarkan buah yang baik di Perancis
B tidak mengeluarkan buah yang baik di Hungary.
C mengeluarkan buah yang baik di Hungary setelah benihnya dikenakan sinaran neutron
D A, B dan C
E A dan C

Petikan 10

New York- Interferon, dadah pertama dihasilkan melalui teknologi kejuruteraan genetik untuk menentang berbagai penyakit daripada lelah hinggalah AIDS, baru-baru ini diluluskan untuk dipasarkan di Amerika Syarikat oleh Kerajaan Persekutuan bagi merawat sejenis barah. Protein penentang penyakit itu baru sahaja diluluskan untuk jualan di kedai-kedai ubat khas bagi merawat penyakit yang dipanggil Hairy Cell Leukimia, sejenis barah yang dialami oleh kira-kira 2000 orang Amerika, kebanyakannya pada peringkat pertengahan umur.

Interferon tersebut di hasilkan oleh sejenis bakteria yang tidak berbahaya . Walaupun ia telah ditemui pertama kalinya 6 tahun lalu, hanya kini ia dianggap 100 peratus tulen, berbanding dengan hanya peratus tulen hasil daripada Interferon yang dahulunya diperolehi sel darah. Kini ia dapat dihasilkan dengan banyaknya.

Terdapat tiga jenis asas Interferons dan jenis yang diluluskan untuk merawat Hairy Cell Leukimia boleh dihasilkan secara semula jadi dalam tubuh oleh sel-sel darah putih dan ia dipanggil Alpha Interferon.

Semua doktor yang ditemuramah telah mengalu-alukan penggunaan Alpha Interferons untuk merawat Hairy Cell Leukimia dan mereka mengakui ia terbukti berkesan untuk merawat beberapa bentuk penyakit barah. Malah publisiti juga telah diberikan mengenainya sebagai sejenis agen yang baik untuk mencegah sakit selsema bila dijadikan semburan hidung.

Namun begitu hanya Hairy Cell Leukimia dikatakan terbukti berjaya dirawat dengan Interferon. "Kami tidak tahu kenapa ia berkesan ke atas bentuk barah tersebut dan bukannya yang lain-lain. Mungkin ini merupakan salah satu kejadian dunia perubatan".

Interferons terbukti separuh berkesan dalam merawat Kaposi's Sarcoma sejenis barah tisu yang mempunyai kaitan dengan AIDS , melanoma dan barah pundi-pundi kencing, serta rahim. Para doktor berharap menggabungkan Interferon dengan rawatan tradisi Chemotherapy untuk merawat penyakit-penyakit itu. Dengan kelulusan jualannya oleh FDA, kini para doktor juga boleh menggunakan ubat ini untuk apa jua penyakit. "ia telah pun dicuba sebagai bahan terapi tunggal ke atas berbagai jenis barah tetapi sekarang kami cuba menggunakannya secara serentak ubat-ubatan lain, " kata doktor Jan Wilchek. "Tiada jaminan yang sepenuhnya dalam perubatan, "kata beliau. Para penyelidik kini cuba mencampur dan memadankan berbagai jenis Interferon dan mengubah sukatannya untuk memastikan sekiranya terdapat gabungan "yang tepat" yang akan terbukti berkesan merawat berbagai penyakit.

"Terlalu banyak yang kita tidak tahu tentang Interferon, "kata Doktor Ronald Blum, Profesor Perubatan di Universiti New York (NYU)yang menyelidik kesan Interferon dalam merawat barah Kaposi's Sarcoma. Interferon mula ditemui pada tahun 1957 oleh sel-sel janin anak ayam yang dijangkiti kuman influenza. Beliau mendapati sel-sel janin ayam itu mengeluarkan sejenis protein yang nampaknya dapat menyekat kuman itu daripada merebak ke sel-sel lain yang sihat. Dalam penyelidikan selanjutnya Doktor Isaacs dan rakan-rakannya mendapati Interferon sebenarnya tidak membunuh kuman tersebut tetapi hanya memberi amaran kepada sel-sel yang masih tidak dijangkiti tentang bahay yang akan terjadi dan menjadikannya kebal menentang jangkitan.

Disesuaikan daripada petikan berita oleh seorang
Wartawan UPI.
Atan Long, Pengajian am,
M. s 15-16
Penerbit Fajar Bakti Sdn Bhd, 1987

46. Teknologi kejuruteraan genetik telah digunakan untuk menentang penyakit
A. lelah
B. Hairy Cell Leukimia
C. selesema
D. Kaposi's Sarcoma
E. semua yang diatas

47. Interferon ialah sejenis
A. barah
B. bakteria
C. dadah
D. protein
E. C dan D

48. Interferon ditemui
A. oleh Dr Alick Isaacs
B. di dalam sel anak ayam
C. di keluarkan oleh sel janin ayam
D. didalam sel janin ayam yang menghidap influenza
E. A dan D

49. Interferon boleh
A. membunuh kuman-kuman penyakit
B. memberi amaran kepada sel-sel sihat untuk mennetang penyakit
C. merawat penyakit
D. A, B dan C
E B dan C

50. Penggunaan Interferon secara Chemotherapy beerti penggunaan secara
laser
kimia
radioaktif
pembedahan
tiada satu pun yang di atas

Vocabulary Tests

Appendix E.3
Vocabulary Pre-test

Penilaian

Nama penuh:

Sekolah:

Kelas:

Jantina: **1** **Lelaki** **2** **Perempuan**

Umur:

Tarikh lahir:

Tarikh Hari ini:

Alamat rumah & Poskod:

Ujian Perbendaharaan

Masa yang dibenarkan: 10 Minit.

Sila carikan makna jawapan bagi perbendaharaan kata yang diberikan di bawah.

1. frekuen

A	B	C	D
setiap hari	kadang-kadang	Masa tertentu	sekali-sekala

2. sebelumnya

A	B	C	D
Idealistik	abstrak	mendahului	pra-peristiwa

3. lelong

A	B	C	D
Dengar	jualan	laungan	sejenis ulat

4. teknik

A	B	C	D
Kuasai	cara	kejuruteraan	kamahiran

5. pangkas

A	B	C	D
Putus	gunting	potong	tebang

6. mempertimbangkan

A	B	C	D
Fikir semula	fikir masak	previu	dacing

7. murka

A	B	C	D
Darah naik	naik angin	marah	datang angin

8. belai

A	B	C	D
Sayang	cium	peluk	usap

9. gantung

A	B	C	D
Pecat	berhenti sekejap	singkir	berhenti sementara

10. korek

A	B	C	D
Gali	toreh	cangkul	kikis

11. Manual

A	B	C	D
Buku revisi	Buku panduan	dengan tangan	automatik

12. Undi

A	B	C	D
Pilih	pangkah	ballot	vote

13. kronometer

A	B	C	D
Jam	pengukur cuaca	pengukur suhu badan	ukur badan

14. orang jalanan

A	B	C	D
Tidak tetap	Puak nomad	seniman	Pengemis

15. Jejambat

A	B	C	D
Jambatan sementara	untuk melintas jalan	jejantas	jejantas

16. terhad

A	B	C	D
Amat Sikit	cukup-cukup	tidak cukup	dalam bidangkuasa

17. beradu

A	B	C	D
Bertanding	berlawan	berehat	tidur

18. aggregat

A	B	C	D
Kombinasi	kumpulan	jumlah	bilangan

19. Tepat

A	B	C	D
Padan	sasaran	betul	cun

20. krustasian

A	B	C	D
Reptilia	sejenis roti	udang	fosil

21. Autentik

A	B	C	D
Tulin	tiruan	cantik	bernilai

22. genre

A	B	C	D
Kategori	puisi	stail	novel

23. perundangan kecil

A	B	C	D
Akta	perlembagaan	Enakmen negeri /subsidiary	statut

24. Semalu

A	B	C	D
Segan	rumput	pokok berduri halus	sembilu

25. konservatif

A	B	C	D
Konvensional	klasik	antik	stereotaip

26. diplomasi

A	B	C	D
Hubungan	keiklasan	ramah	kamahiran komunikasi

27. analogi

A	B	C	D
perbezaan	perbandingan	persamaan	perbualan

28. bencana

A	B	C	D
Fenomena	malapetaka	keburukan	kejahatan

29. berhati-hati

A	B	C	D
perihatin	waspada	Kedekut	ambil berat

30. Toleransi

A	B	C	D
Luas pemikiran	senang bergaul	baik	konsisten

31. Falsafah

A	B	C	D
Ambil berat	Refleksi	Kepercayaan	sekolah

32. dogma

A	B	C	D
rasa bersalah	Pengakuan	Prinsip	sistem hidup

33. metafora

A.	B	C	D
Perantaraan	Perrbandingan langsung	Perbezaan	Persamaan

34. Mukah

A	B	C	D
Tempat	hina	marah	zina

35. Ammarah

A	B	C	D
Marah	benci	meluat	Nafsu Syaitan

36. monolog

A	B	C	D
Berbicara sendiri	Perbualan	dialog	komunikasi

37. hybrid

A	B	C	D
Menipu	sejenis burung	gabungan dua	berselindung

38. hiperbola

A	B	C	D
Unsur berlebihan	melampau	bola besar	sangat besar

39. ambiguiti

A	B	C	D
Bermakna	dua makna	tidak bermakna	kurang jelas

40. kerikil

A	B	C	D
Batu-batu kecil	sejenis kerang	batu-batan	batu-bata

41. emosi

A	B	C	D
Naluri	perasaan	harapan	sedih

42. berprestij

A	B	C	D
Anggun	bermaruh	penting	ada gaya

43. Fenomena

A	B	C	D
jadian	peristiwa	bencana	kemalangan

44. imej

A	B	C	D
Pantulan	salinan	gambaran	baying-bayang

45. Pawana

A	B	C	D
Pawang	Pawagan	dewa	bayu

46. jenuh

A	B	C	D
Jemu	letih	lelah	payah

47. inventif

A	B	C	D
Berangan	kreatif	mencipta	berkaliber

48. expedisi

A	B	C	D
Mempercepatkan	laju	pengembara	perjalanan

49. horizon

A	B	C	D
Perspektif	kawasan	garisan	pemandangan

50. luwes

A	B	C	D
Luas	telus	mudah ubah	terhad

Appendix E.4 Vocabulary : Post-test

Ujian Perbendaharaan 2

Nama:
Kelas:

Sila carikan makna jawapan bagi perbendaharaan kata yang diberikan di bawah:

1. Absurd
   A. Tidak masuk akal
   B. Abstrak
   C. Tidak Benar
   D. Rekaan

2. Kognitif

   A. Pemikiran
   B. Cognak
   C. Fizikal
   D. psikologi

3. Metakognitif
   A. Berfikir tentang berfikir
   B. Fikiran
   C. Psikologi
   D. mental

4. strategi
   A. Terdiri daripada pelbagai teknik
   B. Teknik
   C. Cara
   D. kemahiran

5. monolog
   A. berbicara sendiri
   B. perbualan
   C. dailog
   D. komunikasiD

6. hipotesis
   A. andaian
   B. jangkaan
   C. sangkaan
   D. sintesis

7. Fiksyen
    A. cerita rekaan
    B. cerita benar
    C. dongeng
    D. cerita lama

8. kosmos
    A. Alam semesta
    B. Planet
    C. Orbit
    D. planetariumD

9. reflektif
    A. tindakan
    B. imbas kembali
    C. falsafah
    D. emosi

10. afektif
    A. emosi
    B. fizikal
    C. perasaan
    D. psikomotor

11. konservatif
    A. konvenional
    B. klasik
    C. antik
    D. stereotaip

12. hemoglobin
    A. warna kemerahan dalam darah
    B. darah putih
    C. darah beku
    D. sejenis sel

13. metabolisme
    A. proses fotosintesis
    B. perubahan kimia dalam tubuh
    C. aliran darah
    D. perubahan tenaga dan kimia dalam tubuh

14. peka
    A. tidak mendengar
    B. sensitive
    C. tidak akur
    D. agak akur

15. genre
    A. kategori
    B. puisi
    C. stail
    D. novel

16. flora dan fauna
    A. jenis tumbuhan
    B. hutan
    C. tumbuhan dan binatang
    D. binatang

17. lingua franca
    A. dialek
    B. bahasa tempatan
    C. bahasa antarabangsa
    D. bahasa rasmi

18. sinaran gama
    A. ultraviolet
    B. sinaran daripada television
    C. cahaya
    D. sinaran yang meresap daripada bahan radioaktif

19. sumur
    A. sawah
    B. Lumpur
    C. Perigi
    D. padi

20. autentik
    A. tulin
    B. tiruan
    C. cantik
    D. bernilai

21. teknik
    A. kaedah
    B. kemahiran
    C. kuasai
    D. kejuruteraan

22. semantik
    A. linguistik
    B. makna
    C. ilmu ghaib
    D. aspek tatabahasa

23. kimoterapi
    A. laser
    B. perubahatan tradisional
    C. penggunaan dadah
    D. sinar gama

24. aspirasi
    A. keinginan
    B. objektif
    C. ilham
    D. matlamat

25. asmaraloka
    A. seloka
    B. sejenis puisi
    C. pantun
    D. alam cinta

26. anarki
    A. kacau bilau
    B. nama kerajaan
    C. peraturan
    D. teratur

27. analisa
    A. memerhati
    B. cerakin
    C. sintesis
    D. fahami

28. melankolik
    A. sejenis sajak
    B. sayu
    C. mood
    D. rima

29. karisma
    A. bakat
    B. pemimpin
    C. watak
    D. perangai

30. motivasi
    A. suka
    B. minat
    C. penggerak
    D. intuisi

31. mood
    A. suasana yang memberangsangkan
    B. minat
    C. keadaan sedih
    D. suka dan duka

32. pengamatan
    A. melihat
    B. penelitian
    C. persepsi
    D. penganalisaan

33. pujangga
    A. ahli fikir
    B. perindu
    C. pencinta
    D. penglipur

34. estetika
    A. keindahan dalam seni
    B. kecantikan
    C. keanggunan
    D. ketampanan

35. kumulatif
    A. kira-kira
    B. hitung
    C. himpunan
    D. sejenis kumpulan

36. koreografi
    A. reka bentuk
    B. reka baju
    C. reka muzik
    D. reka tari

37. spesis
    A. golongan manusia
    B. golongan binatang
    C. golongan tumbuhan
    D. golongan benda

38. purbawara
    A. drama kuno
    B. drama moden
    C. lakoknan semula
    D. episod

39. gertak
    A. kejut
    B. ancam
    C. rampas
    D. takut

40. tersirat
    A. maksud
    B. nyata
    C. jelas
    D. tersembunyi

41. menimbang
    A. mengeti
    B. memikir semula
    C. previu
    D. memberi perhatian

42. pengetik
    A. pembakar
    B. murutaip
    C. jurukira
    D. jurubahasa

43. ozon
    A. awan
    B. lapisan langit
    C. sejenis gas daripada cantuman 3 atom oksigen
    D. lapisan udara yang hampir dengan bumi

44. demokratik
    A. rakyat berkuasa memilih pemerihtahan
    B. kerajaan pusat dan negeri berkuasa
    C. kuasa hanya pada Perdana Menteri dan kabinet
    D. Raja dan rakyat berhjak untuk memerintah

45. perlembagaan
    A. undang-undang Westminster
    B. peraturan-peraturan daripada kerajaan pusat
    C. peraturan dan undang-undang yang menentukan organisasi dan pembahagian kuasa badan-badan pemerintah
    D. sekumpulan perundangan

46. hirarki
    A. nama sistem pemerintahan
    B. sejenis fahaman
    C. golongan pemerintah
    D. susunan pertubuhan dari rendah hingga tinggi sekali

47. aklamasi
    A. suara bulat untuk sesuatu cadangan
    B. deklamasi
    C. ucapan
    D. cadangan

48. akad
    A. akademi
    B. pusat beli-belah
    C. pertemuan
    D. perjanjian

49. pengkorporatan
    A. Persyarikatan sesebuah badan kerajaan
    B. Sebuah konsortium yang ditubuhkan oleh kerajaan
    C. Penyerahan pengurusan yang tidak sepenuhnya satu-satu perusahaann milik pemerintah kepada korporat
    D. Penyerahan pengurusan yang sepenuhnya kepada pihak swasta

50. red-tape
    A. kerenah birokrasi
    B. tape perakam
    C. memo amaran
    D. kerenah golongan atasan

Appendix F

Questionnaires

F.1. MSLQ questionnaires .

F.2. Strategy use questionnaire

F.3. Teachers and Students opinion

F.3.1 Teachers opinion

F.3.2 students opinion

Appendix F.1

DEMOGRAPHIC INFORMATION
(Maklumat Demokgrafik)

1. Name/Nama:_____ **Class/**kelas:_____

2. Gender (Circle One). (Jantina)

Male /Lelaki **Female/**Perempuan

3. Age (Umur)_____ **Date of Birth/**Tarikh Lahir:_____

4. Ethnic background (Circle one). Etnik (Bulatkan)

Malay/Melayu **Indian/**India **Chinese/**Cina **Other/**lain-lain

5. How many papers/subjects are you taking? (Berapakah jumlah kertas/mata-pelajaran yang anda ambil?)

_____

6. How many hours a week do you study for this paper/subject?
(Berapa jam kah dalam seminggu anda belajar untuk kertas/subjek ini?

_____

.

Arahan: Bulatkan nombor (1,2,3,4,5,6,7) yang menggambarkan apa yang anda buat dan fikir ketika membaca. Tiada jawapan yang betul ataupun salah. Jangan mengambil masa terlalu lama untuk satu-satu penyataan.
Directions: Circle the number (1,2,3,4,5,6,7) that best describes what you do or what you think about as you read. There are no right or wrong answers. Do not spend so much times on any one statement.

Skala/**Scale**

Bahagian A (section A) Expectancy component: self-efficacy for learning and performance (penilaian kendiri)	Not at all true of me **Tidak benar sama sekali tentang saya**	←			Very true of me **Sangat benar tentang saya**
01. **Saya berharap dapat melakukan yang terbaik berbanding pelajar-pelajar lain dalam kelas ini.** 01. Compared with other students in this class I Expect to do well.	1	2	3	4	5
02. **Saya yakin saya memahami idea-idea yang diajar dalam kursus ini.** 02.I'm certain I can understand the ideas taught in this course.	1	2	3	4	5
03. Saya berharap dapat melakukan yang terbaik dalam kelas ini. 03.I expect to do very well in this class.	1	2	3	4	5
04. Berbanding dengan pelajar-pelajar lain, saya fikir saya adalah pelajar yang baik. 04.Compared with others in this class, I think I'm a good student.	1	2	3	4	5
05. Saya yakin saya dapat melakukan kerja yang cemerlang dalam permasalahan dan tugasan yang diberikan untuk kelas. 05.I am sure I can do an excellent job on the Problems and tasks assigned for this class.	1	2	3	4	5

06. Saya fikir saya akan mendapat gred yang baik untuk kelas ini. 06. I think I will receive a good grade in this class .	1	2	3	4	5
07. Kemahiran belajar saya adalah cemerlang berbanding dengan pelajar-pelajar lain dalam kelas ini. 07. My study skills are excellent compared with others in this class.	1	2	3	4	5
08. Berbanding dengan pelajar-pelajar lain, saya fikir saya mengetahui banyak tentang subjek yang diajar. 08. Compared with other students in this class I think I know a great deal about the subject.	1	2	3	4	5
09. Saya tahu yang saya akan mempelajari bahan yang diajar untuk kelas. 09. I know that I will be able to learn the material for this class.	1	2	3	4	5

Bahagian B (Section B)
Intrinsic Value (Intrinsic goal orientation)

10. Saya lebih suka kerja kelas yang mencabar agar saya dapat m empelajari perkara-perkara baru. 10. I prefer class work that is challenging so I can learn new things.	1	2	3	4	5
11. Adalah penting bagi saya untuk mempelajari apa yang diajar didalam kelas. 11.It is important for me to learn what is being taught in this class	1	2	3	4	5
12. Saya suka apa yang saya pelajari dalam kelas. I2. like what I am learning in this class	1	2	3	4	5
13. Saya fikir saya dapat mengaplikasikan apa yang saya pelajari dari kelas ini dalam kelas-kelas lain. 13. I think I will be able to use what I learn in this class in other classes.	1	2	3	4	5

14. Kebiasaanya saya memilih topik-topik yang saya akan pelajari daripadanya walaupun memerlukan lebih banyak kerja. 11. I often choose paper topics I will learn something from even if they require more work.	1	2	3	4	5
15. Walaupun keputusan saya tidak begitu memuaskan, saya akan mempelajari daripada kesilapan yang telah dilakukan. 12. Even when I do poorly on a test I try to learn from my mistakes	1	2	3	4	5
16. Saya fikir apa yang saya pelajari dalam kelas ini adalah berguna untuk diketahui. 13. I think that what I am learning in this class is useful for me to know.	1	2	3	4	5
17. Saya fikir apa yang saya pelajari daripada kelas ini adalah menarik. 14. I think that what we are learning in this class is interesting.	1	2	3	4	5
18. Memahami subjek-subjek yang diajar ialah penting bagi saya. 18. Understanding this subjects is important to me.	1	2	3	4	5

Bahagian C (Section C)

Affective Component: Test Anxiety

19. Saya terlalu gementar semasa ujian sehingga saya tidak dapat mengingati fakta-fakta yang saya pelajari. 19. I am so nervous during a test that I cannot remember the facts I have learned.	1	2	3	4	5
20. Saya berasa tidak begitu selesa dan senang apabila mengambil ujian. 20. I have an uneasy,upset feeling when I take a test.	1	2	3	4	5
21. Saya terlalu risau tentang ujian. 21. I worry a great deal about tests.	1	2	3	4	5
22. Apabila saya mengambil ujian, saya memikirkan tentang betapa teruknya apa yang saya telah buat. 22. When I take a test I think about how poorly I am doing.	1	2	3	4	5

Bahagian D (Section D)
Cognitive strategy use

23.Apabila saya membaca atau mendengar sesuatu pernyataan atau kesimpulan, saya akan memikirkan alternatif-alternatif lain. 23. Whenever I read or hear an assertion or conclusion in this class, I think about possible alternatives.	1	2	3	4	5
24. Saya selalu mempersoalkan perkara-perkara yang dibaca untuk membuat keputusan yang meyakinkan. 24. I often find myself questioning things I hear or read in this course to decide if I find them convincing.	1	2	3	4	5
25. Saya mendapati sukar untuk membuat keputusan tentang idea-idea penting yang terdapat dalam bacaan saya. 25. It is hard for me to decide what the main ideas are in what we read.	1	2	3	4	5
26. Apabila saya belajar, saya menulis ringkasan idea-idea penting yang terdapat dalam bacaan saya. 26. When I study I write summaries of main ideas from readings.	1	2	3	4	5
27.Apabila saya belajar, saya mengulas idea-idea penting dengan menggunakan ayat sendiri. 27. When I study, I put important ideas into my own words.	1	2	3	4	5
28. Apabila saya belajar untuk satu-satu ujian, saya akan cuba sedaya upaya mengingati sebanyak-banyak fakta yang saya dapat. 28. When I study for a test I try to remember as many facts as I can.	1	2	3	4	5
29. Apabila belajar, saya menyalin nota-nota semula untuk membantu saya mengingati bahan-bahan yang dipelajari. 29. When studying,I copy my notes over to help me remember material.	1	2	3	4	5

30. Apabila saya belajar untuk ujian, saya akan cuba berlatih menyatakan fakta-fakta penting secara berulang-ulang pada saya sendiri. 30. When I study for a test I practice saying the important facts over and over to myself.	1	2	3	4	5
31. Saya menggunakan apa yang saya pelajari daripada kerja kursus/tugasan yang lama dan buku teks untuk membuat tugasan yang baru. 31. I use what I have learned from old homework assignment and the textbook to do new assignments.	1	2	3	4	5
32. Apabila sesuatu teori, tafsiran, atay kesimpulan dibentangkan dalam kelas ataupun bacaan, saya akan cuba membuat keputusan jika terdapat bukti-bukti yang boleh mendokong kesimpulan tersebut. 32. When a theory, interpretation, or conclusion is presented in class or in the readings, I try to decide if there is good supporting evidence.	1	2	3	4	5
34. Apabila saya membaca bahan untuk kelas, saya akan mengulangi perkataan-perkataan tersebut pada saya sendiri untuk membantu saya mengingatinya. 33. When I read material for this class, I say the words over and over to myself to help me remember.	1	2	3	4	5
35. Saya menggariskan setiap bab dalam buku saya untuk membantu saya belajar. 35. I outline the chapters in my book to help me study.	1	2	3	4	5
36. Apabila membaca, saya cuba untuk mengaitkan perkara-perkara yang dibaca dengan apa yang saya sudah ketahui. 36.When reading I try to connect the things I am reading about with what I already know.	1	2	3	4	5

Bahagian E (Section E)
Metacognitive self-regulation

37. Saya menanyakan diri saya soalan-soalan untuk memastikan saya mengetahui bahan-bahan yang saya pelajari. 37. I ask myself question to make sure I know the material I have been studying.	1	2	3	4	5
38. Apabila membaca sesuatu petikan, saya akan membinan soalan untuk membantu saya agar lebih focus ketika membaca. 38.When reading a passage, I make up questions to help focus my reading.	1	2	3	4	5
39. Apabila saya keliru tentang apla yang saya baca, saya akan meninjau semula apa yang telah dibaca. 39. When I become confused about something I'm reading, I go back and try to figure it out.	1	2	3	4	5
40. Jika bahan yang dibaca sukar difahami, saya akan cuba menukar strategi atau cara saya membaca bahan-bahan tersebut. 40. If the materials are difficult to understand, I change the strategy/way I read the materials..	1	2	3	4	5
41. Sebelum mula belajar, saya akan memikirkan tentang perkara-perkara yang perlu dibelajar. 41. Before I begin studying I think about the things I will need to do to learn.	1	2	3	4	5
42. Saya dapati yang saya telah membaca untuk kelas yang akan diikuti tapi tidak mengetahui perkara yang telah dibaca. 42. I often find that I have been reading for class but don't know what it is all about.	1	2	3	4	5
44. Apabila belajar, saya akan cuba mencari penjelasan konsep-konsep yang saya tidak begitu faham. 44. When studying for this course I try to determine which concepts I don't understand well.	1	2	3	4	5

45.Apabila saya belajar untuk satu-satu subjek, saya mempunyai sasaran atau tujuan sebagai panduan kerja/aktiviti yang saya lakukan dalam kelas. 45. When I study, I set goals for myself in order to direct my activities in each study period.	1	2	3	4	5
46. Saya cuba menukar strategi atau cara saya belajar mengikut keperluan subjek atau kursus dan stail pengajaran instruktor berkenaan. 46. I try to change the way I study in order to fit the subject's of course requirement and instructor's teaching style.	1	2	3	4	5
Bahagian F (section F) **Resource management: Peer learning**					
47.Apabila belajar untuk kursus/subjek ini, saya biasanya cuba menerangkan bahan-bahan yang dipelajari kepada rakan sekelas atau kawan. 47. When studying for this course, I often try to explain the material to a classmate or a friend.	1	2	3	4	5
48. Saya cuba bekerja dengan pelajar-pelajar lain daripada kelas ini untuk menyiapkan tugasan. 48. I try to work with other students from this class to complete the course assignments.	1	2	3	4	5
49.Apabila belajar untuk kursus ini, saya biasanya meluangkan masa untuk membincangkan bahan pembelajaran dengan sekumpulan pelajar daripada kelas ini. 49. When studying for this course, I often set aside time to discuss the course material with a group of students from the class.	1	2	3	4	5

Appendix F.2

Strategy use questionnaire

Name:_____

Take your time on this part.

1. **Describe in a picture or words the strategies you used to help you understand the passages. (Berikan deskripsi dalam ayat anda sendiri tentang strategi yang anda gunakan untuk memahami petikan)**

2. **What about these strategies was useful to you ?**
   (Bagaimanakah strategi-strategi tersebut berguna bagi anda)

3. **If you didn't use any visual or verbal strategies, what about them was not useful?**
   (Jika anda tidak menggunakan strategi berbentuk gambar atau verbal (oral/suara) kenapa anda fikir strategi tersebut tidak diperlukan?,

Appendix F.3.1

Teacher's Opinion/Interview

Questions for the teacher to consider regarding the strategies or instructions conducted with the students.
(Soalan-soalan yang ditujukan kepada guru tentang pengajaran atau strategi-strategi yang diajar kepada para pelajar).

1. **Of what you have seen and heard about the metacognitive strategies during the research, what would you say about....**
Daripada apa yang telah dilihat dan didengar tentang strategi metacognitif semasa penyelidikan sedang dijalankan, apakah yang anda boleh nyatakan tentang:

(i) **its feasibility and usefulness as the appropriate strategies for this age/ability level of reader.**
(Kemudahan dan keperluannya sebagai strategi yang sesuai bagi pembaca pada tahap /peringkat umur ini.

(ii) **the content of the materials used**. (Kandungan bahan yang digunakan).

---

1. **Do you think that you might use this strategy yourself in future lessons(in different subjects/papers./courses)? If so, what would you change or adapt? If not, say why.**

(Adakah anda fikir yang anda akan gunakan strategi-strategi ini dalam pengajaran anda pada masa akan datang (dalam pelbagai mata-pelajaran/kertas/kursus)? Jika ya, apakah yang anda akan tukar atau ubahsuai? Jika tidak, kenapa?

---

2. **If you already use such a strategy for helping students answer reading comprehension questions, can you describe it.**

(Jika anda sudah pernah menggunakan strategi tersebut untuk menjawab soalan pemahaman , bolehkan anda memberikan deskripsi strategi tersebut.

---

3. **Referring to the results, would ou conclude that the students' involves benefitted from the instructions of metacognitive strategies ?**
(Berdasarkan pada keputusan pelajar, bolehkan anda buat kesimpulan yang pelajar-pelajar yang terlibat telah mendapat manfaat daripada pengajaran strategi-strategi metacognitif?)

---

4. **Overall, what is your opinion of the results which have been recorded for this investigation?**

   (Secara keseluruhannya, apakah pendapat anda tentang keputusan yang telah direkodkan untuk kajian ini).

---

5. **Are there any further comments you wish to make or areas that you think are important that I have failed to include?**

   (Apakah komen-komen anda yang selanjutnya tentang bidang-bidang yang anda fikir penting yang saya belum sentuh/belum tanya?

Thank you
Terima kasih

Appendix F.3.2
Soal selidik bagi pelajar-pelajar
Student Questionnaire

Please answer the following questions about the metacognitive strategies that you've learned recently. There is no need to write in sentences.
Sila jawab soalan tentang strategi metacognitif yang anda telah pelajari baru-baru ini, Anda tidak perlu menulis dalam ayat yang lengkap.

1. Adakah anda fikir yang strategi yang anda pelajari akan membantu anda belajar dan memahami teks atau bahan bacaan lain pada masa akan datang?
Do you think that what you've learned will help you to study and understand the text or any other reading materials given in the future?

2.Adakah strategi yand dipelajari :(Did you find learning the four strategies)

i). Mudah (easy),
ii). Mengelirukan tapi boleh difahami (Confusing but you managed to understand)
iii) Terlalu sukar untuk anda (too difficult for you)

Nyatakan sebab-sebabnya (Say Why?)

---

3. Strategi manakah yang anda fikir paling sukar bagi anda? Membina hipotesis, membina soalan, membuat ringkasan atau menyuarakan strategi dan pemahaman anda?
Which of the metacognitive strategies did you have most difficult with? Generating hypothesis, generating questions, summarizing or verbalizing ?

---

4. Jika seseorang bertanya tentang apa yang telah anda pelajari daripada menggunakan strategi metacognitif, apa yang anda akan nyata? **If someone asked you what you had learned from using the metacognitive strategies, what would you tell them?**

---

5. Di bawah adalah pandangan anda tentang strategi metacognitif. Sila tandakan /TIK pernyataan yang menggambarkan perasaan anda tentang strategi tersebut.
Below are opinions that you might have about learning the metacognitive strategies. Tick as many of them that describe the way you feel about it.

i. ____ **Strategi yang berguna untuk belajar** (A useful strategy for studying) .
ii. ____ **Berguna untuk memahami & mencari isi-isi penting**. Useful to understand and find main ideas
iii. ____ **Berguna untuk mengingati maklumat** (Useful to remember information)
iv. ____ **Saya lebih suka menghafal untuk mengingati maklumat**. (I rather memorize the information for the examination)
v. ____. **Saya tidak akan menggunakannya langsung (I'll never use it anywhere)**

6. Adakah anda lebih yakin dan bermotivasi untuk menggunakan strategi untuk belajar bagi Peperiksaan Tingkatan Enam yang akan datang?
Are you confident and motivated on using the strategies to study for the coming National Examinations (STPM)?

Appendix G.

Consent form

Appendix G

ASSURANCE OF CONFIDENTIALITY STATEMENT

I understand that all information which would permit identification of the individual will be held strictly confidential, will be used only by persons engaged in and for the purposes of the survey, and will not be disclosed or released to others for any other purposes.

I understand that study will be conducted on between March 2001 and May 2001.

I Consent to participate to the survey under the conditions above.

Signature Date

_____ _____

Appendix H

H.1 Skewness and curtosis
H.2 Correlations of MSLQ with Performance
H.3 Regression and residuals statistics

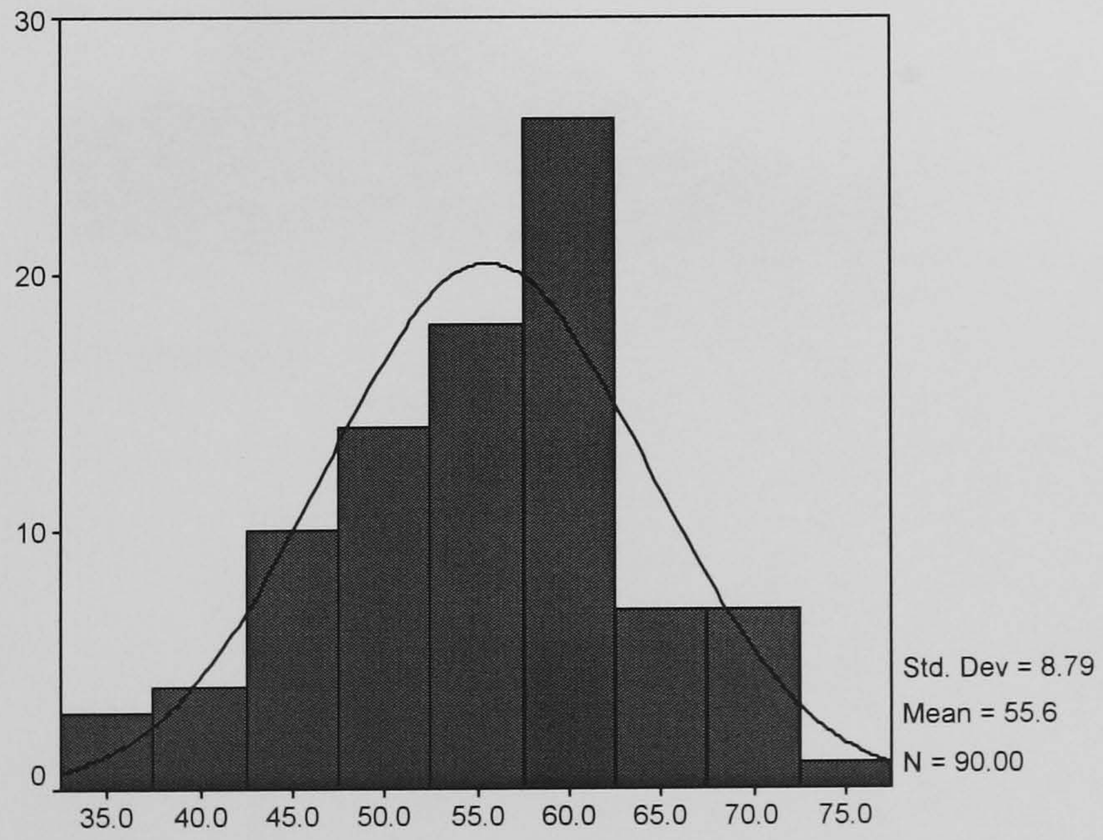
Appendix H.1

Skewness and curtosis

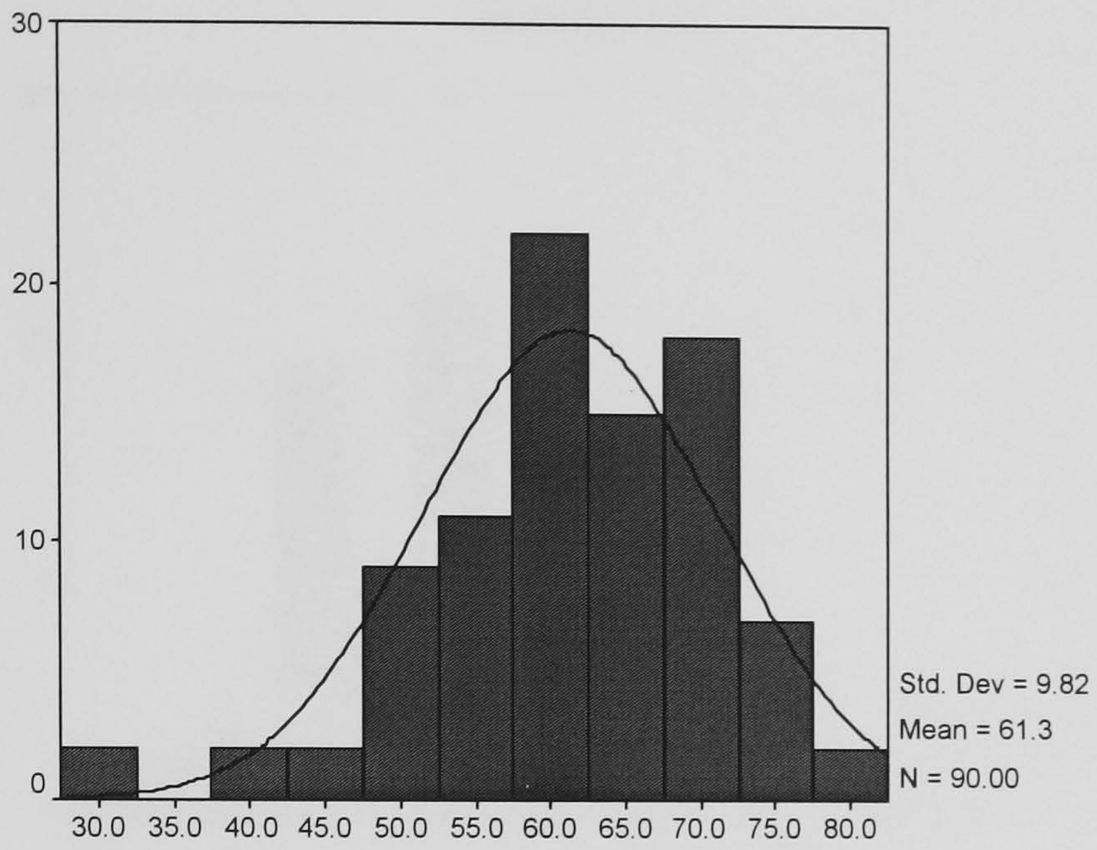
Descriptive Statistics

	N	Mean	Std.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Pre-comprehension	90	55.5556	8.79110	-.344	.254	-.012	.503
Post-comprehensioln	90	61.2889	9.81771	-.792	.254	1.035	.503
Pre-vocabulary	90	46.9333	9.84007	.790	.254	.806	.503
Post vocabulary	90	49.4000	10.15586	.286	.254	.278	.503
Previous grade in social studies	90	53.0889	8.81475	-.627	.254	.243	.503
School grade	90	56.5667	7.87265	-.307	.254	-.112	.503
Valid N (listwise)	90						

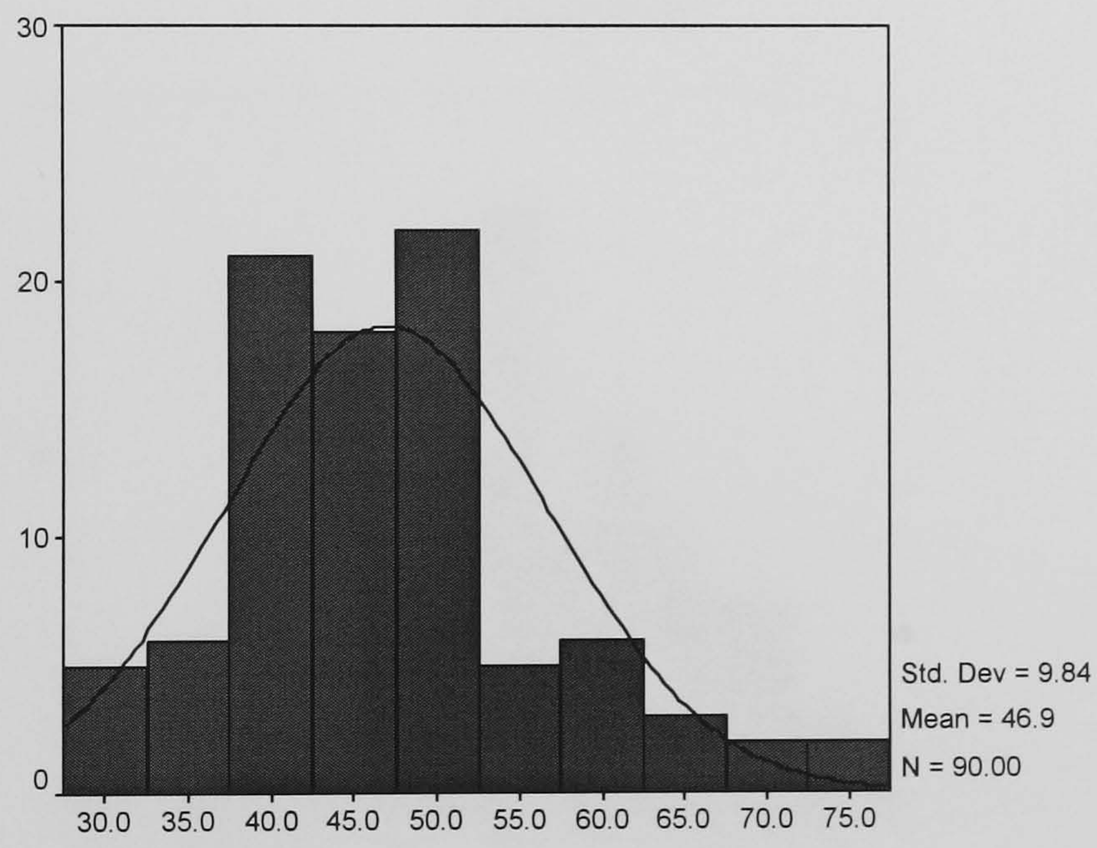
Graph 1



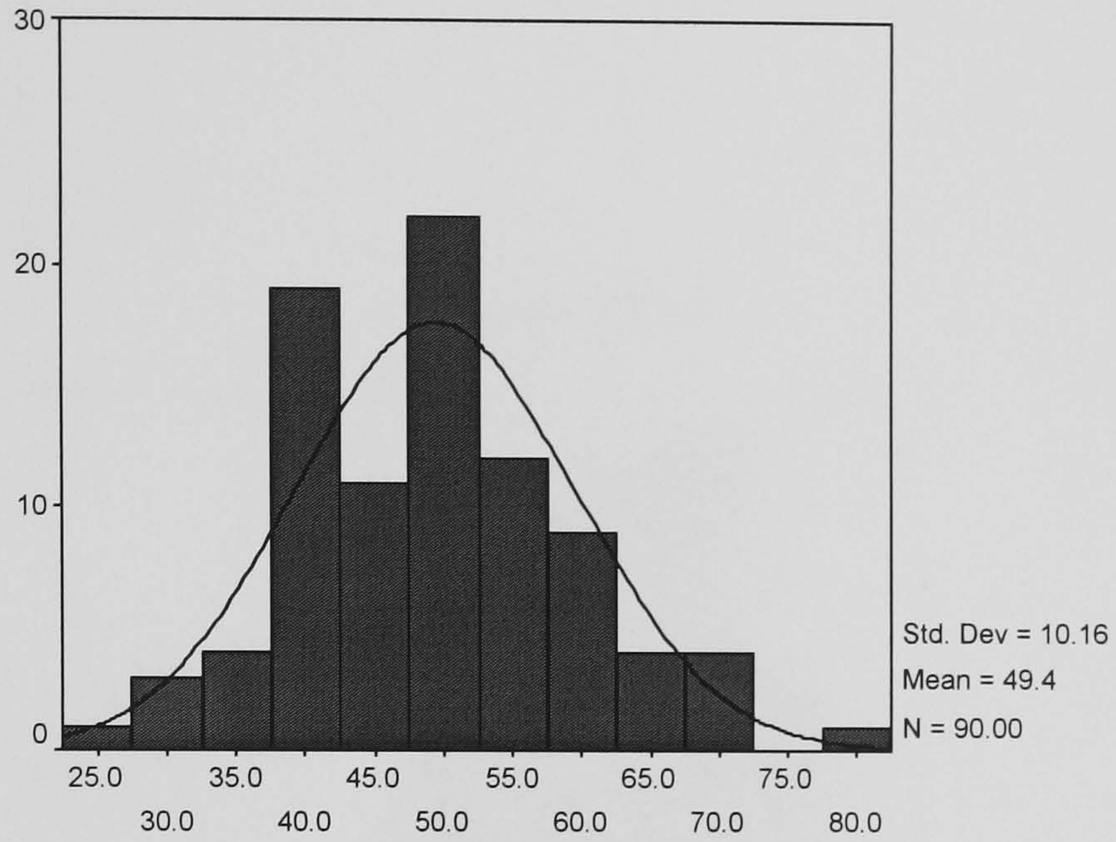
Graph 2



Graph3

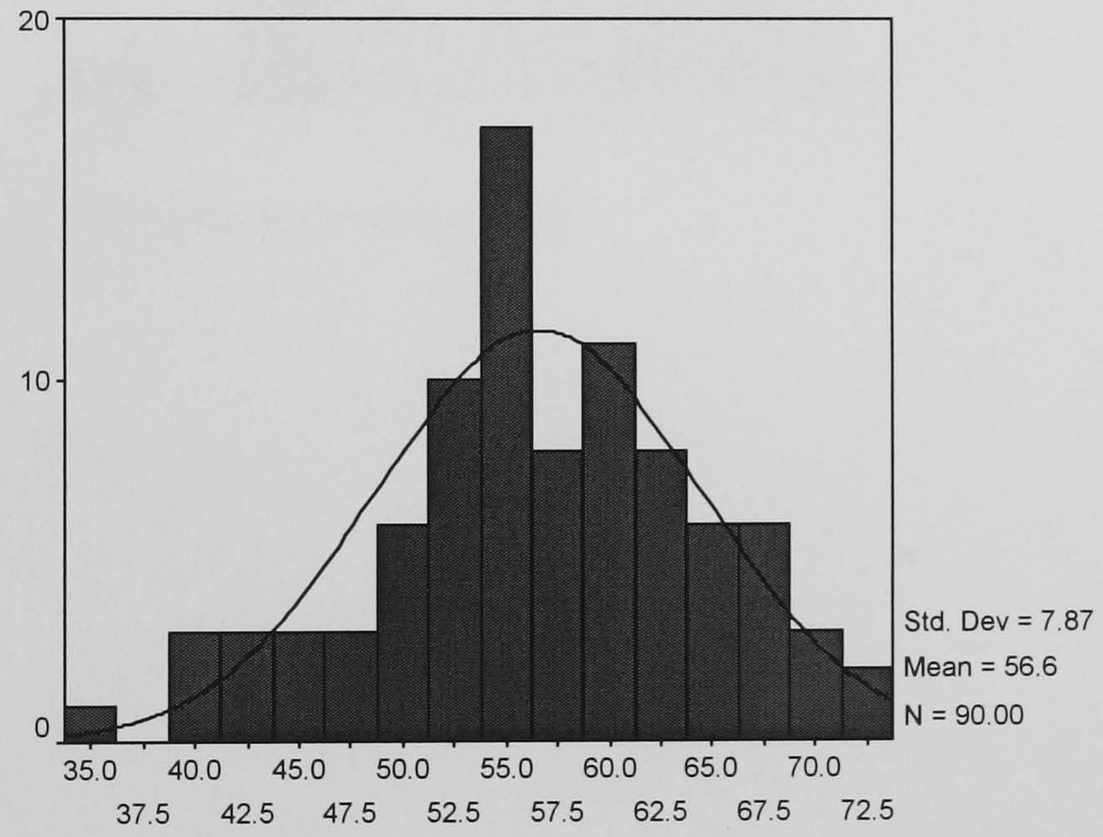


Graph 4



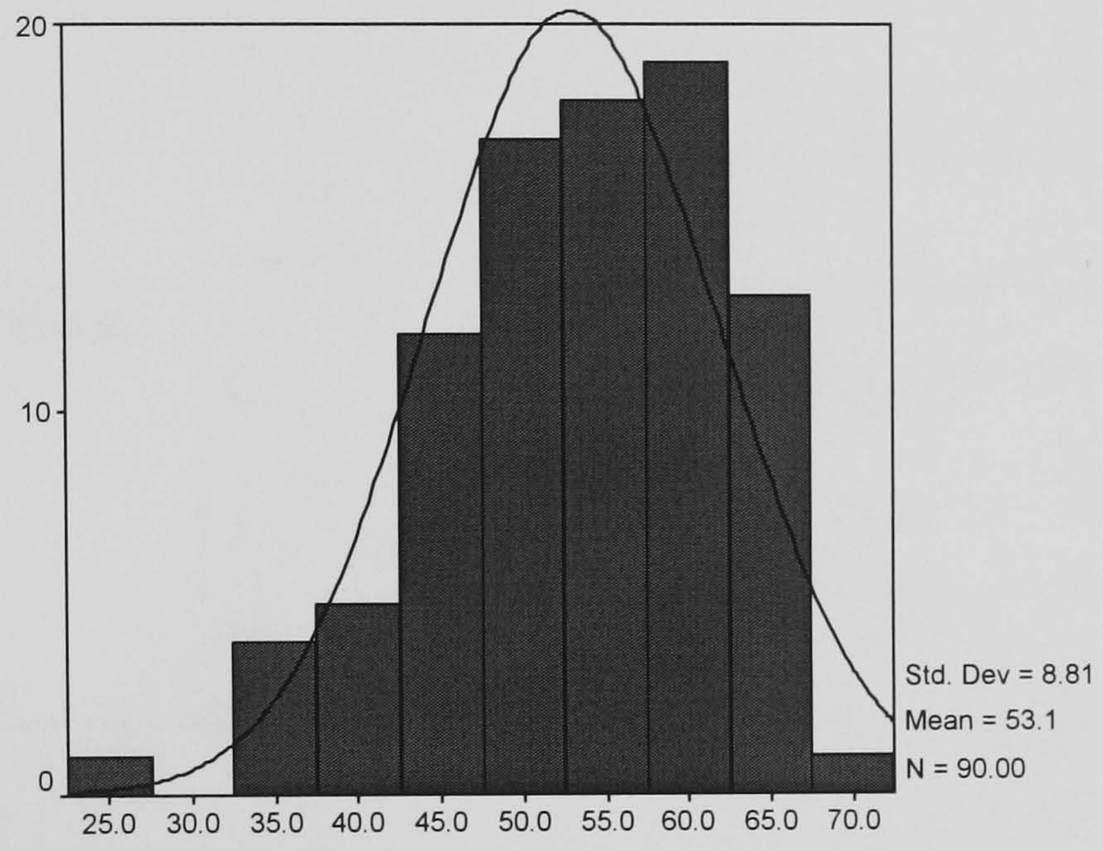
Post vocabulary

Graph 5



School grade

Graph 6


20
10
0
25.0
30.0
35.0
40.0
45.0
50.0
55.0
60.0
65.0
70.0
Std. Dev = 8.81
Mean = 53.1
N = 90.00
Previous grade in social studies

Appendix H.2

Correlations of MSLQ with Performance

Subscales correlations of MSLQ (from the Pre-test) with final grade

SUBSCALES		Correlations (r)
Motivational variables	Self efficacy	.28**
	Intrinsic goal orientation	.17
	Anxiety	-.15
	Mean: Motivational variables	.15
Self-regulated learning variables	Cognitive strategies	.15
	Metacognitive learning strategies	.32**
	Peer learning	.23*
	Mean: self-regulated learning variables	.27**

Subscales correlations of MSLQ (from the Post-test) with final grade

SUBSCALES		Correlations (r)
Motivational variables	Self efficacy	.249*
	Intrinsic goal orientation	0.07
	Anxiety	-0.06
	Total score (Mean): Motivational variables	.131
Self-regulated learning variables	Cognitive strategies	0.73**
	Metacognitive learning strategies	0.86**
	Peer learning	0.74**
	Total score (Mean): self-regulated learning variables	0.28**

Correlation of Total MSLQ score with performance

Correlation of Total MSLQ score (pre-test) with performance

Performance		Correlation (r)
Comprehension	Pre-test	.02
	Post-test	.22*
Vocabulary	Pre-test	-.053
	Post-test	.31*
Previous grade in general studies		-.23*
School grade		-.20

Correlation of Total MSLQ score (post-test) with performance

Performance		Correlation (r)
Comprehension	Pre-test	.040
	Post-test	.228**
Vocabulary	Pre-test	-.068
	Post-test	.185
Previous grade in general studies		-.232*
School grade		-.158

Appendix H.3
Regression and residuals statistics

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Pre-comprehension[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Post-comprehensioln

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.300[a]	.090	.080	9.41892	.090	8.696	1	88	.004

a. Predictors: (Constant), Pre-comprehension

b. Dependent Variable: Post-comprehensioln

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	771.474	1	771.474	8.696	.004[a]
	Residual	7807.015	88	88.716		
	Total	8578.489	89			

a. Predictors: (Constant), Pre-comprehension

b. Dependent Variable: Post-comprehensioln

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	42.683	6.387		6.683	.000
	Pre-comprehension	.335	.114	.300	2.949	.004

a. Dependent Variable: Post-comprehensioln

Casewise Diagnostics[a]

Case Number	Std. Residual	Post-comprehensioln
8	-3.621	28.00
35	-3.125	32.00

a. Dependent Variable: Post-comprehensioln

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	54.0698	68.1358	61.2889	2.94419	90
Residual	-34.1075	17.8925	.0000	9.36586	90
Std. Predicted Value	-2.452	2.326	.000	1.000	90
Std. Residual	-3.621	1.900	.000	.994	90

a. Dependent Variable: Post-comprehensioln

Regression

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Pre-comprehension[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Post-comprehensioln

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.300[a]	.090	.080	9.41892	.090	8.696	1	88	.004

a. Predictors: (Constant), Pre-comprehension

b. Dependent Variable: Post-comprehensioln

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	771.474	1	771.474	8.696	.004[a]
	Residual	7807.015	88	88.716		
	Total	8578.489	89			

a. Predictors: (Constant), Pre-comprehension

b. Dependent Variable: Post-comprehensioln

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	42.683	6.387		6.683	.000
	Pre-comprehension	.335	.114	.300	2.949	.004

a. Dependent Variable: Post-comprehensioln

Casewise Diagnostics[a]

Case Number	Std. Residual	Post-comprehensioln
8	-3.621	28.00
35	-3.125	32.00

a. Dependent Variable: Post-comprehensioln

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	54.0698	68.1358	61.2889	2.94419	90
Residual	-34.1075	17.8925	.0000	9.36586	90
Std. Predicted Value	-2.452	2.326	.000	1.000	90
Std. Residual	-3.621	1.900	.000	.994	90

a. Dependent Variable: Post-comprehensioln

Regression

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	MEANPOSM[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Standardized Residual

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.124[a]	.015	.004	.99231804	.015	1.368	1	88	.245

a. Predictors: (Constant), MEANPOSM

b. Dependent Variable: Standardized Residual

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.347	1	1.347	1.368	.245[a]
	Residual	86.653	88	.985		
	Total	88.000	89			

a. Predictors: (Constant), MEANPOSM

b. Dependent Variable: Standardized Residual

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.41E-16	.105		.000	1.000
	MEANPOSM	.188	.161	.124	1.170	.245

a. Dependent Variable: Standardized Residual

Casewise Diagnostics[a]

Case Number	Std. Residual	Standardized Residual
8	-3.807	-3.62117

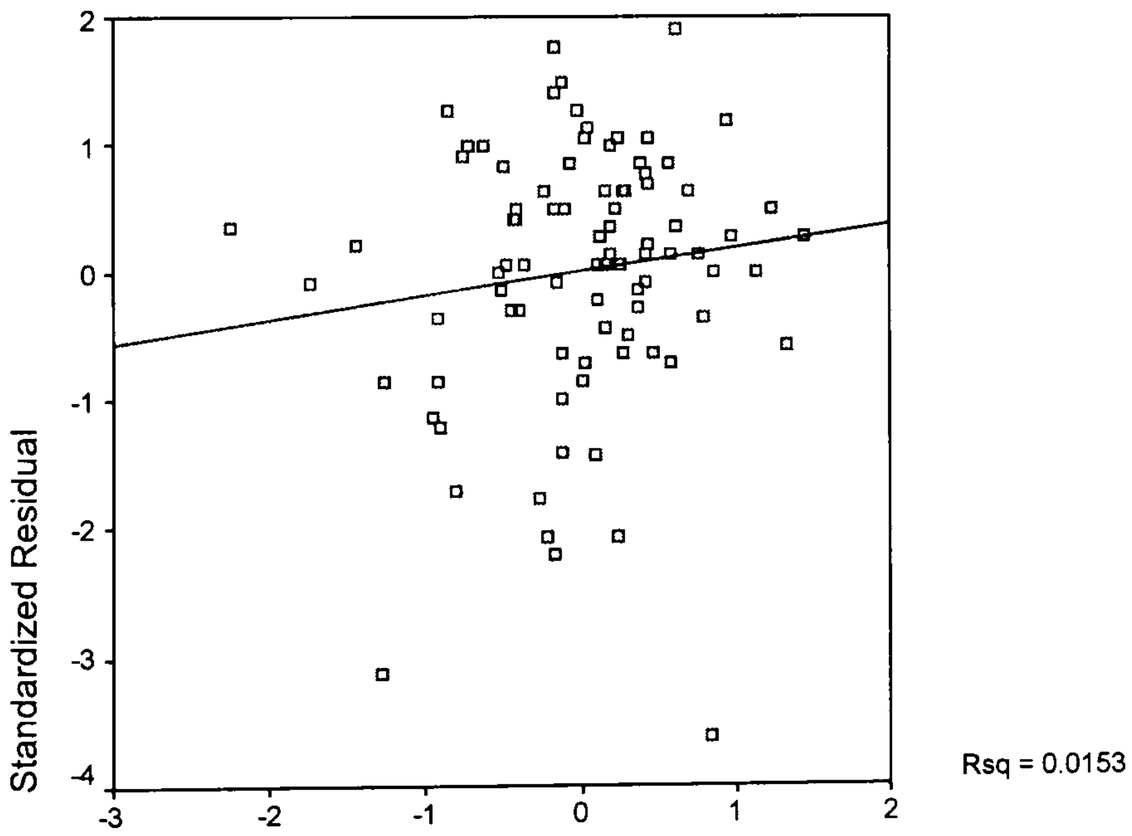
a. Dependent Variable: Standardized Residual

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-.4212982	.2706093	.0000000	.12301604	90
Residual	-3.77765	1.7923706	.0000000	.98672747	90
Std. Predicted Value	-3.425	2.200	.000	1.000	90
Std. Residual	-3.807	1.806	.000	.994	90

a. Dependent Variable: Standardized Residual

Graph



Regression

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	POSTLS[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Standardized Residual

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.271[a]	.073	.063	.96265720	.073	6.960	1	88	.010

a. Predictors: (Constant), POSTLS

b. Dependent Variable: Standardized Residual

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.450	1	6.450	6.960	.010[a]
	Residual	81.550	88	.927		
	Total	88.000	89			

a. Predictors: (Constant), POSTLS

b. Dependent Variable: Standardized Residual

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.62E-16	.101		.000	1.000
	POSTLS	.347	.131	.271	2.638	.010

a. Dependent Variable: Standardized Residual

Casewise Diagnostics[a]

Case Number	Std. Residual	Standardized Residual
8	-3.083	-3.62117

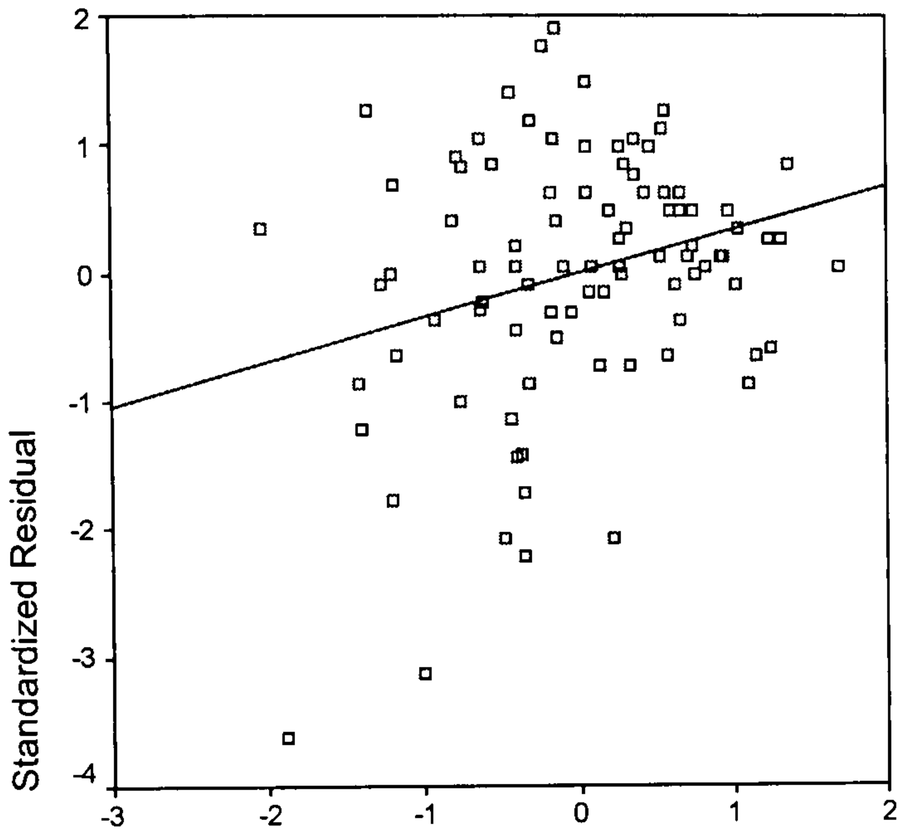
a. Dependent Variable: Standardized Residual

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	-.7032028	.5852817	.0000000	.26919809	90
Residual	-2.96804	1.9474103	.0000000	.95723374	90
Std. Predicted Value	-2.612	2.174	.000	1.000	90
Std. Residual	-3.083	2.023	.000	.994	90

a. Dependent Variable: Standardized Residual

Graph



Rsq = 0.0733

self-regulated learning strategies(Post-test)

Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
Post-comprehensioln	61.2889	9.81771	90
Post vocabulary	49.4000	10.15586	90
School grade	56.5667	7.87265	90
Previous grade in social studies	53.0889	8.81475	90

Correlations

		Post-comprehensioln	Post vocabulary	School grade	Previous grade in social studies
Post-comprehensioln	Pearson Correlation	1	.334**	.087	.070
	Sig. (2-tailed)	.	.001	.417	.515
	N	90	90	90	90
Post vocabulary	Pearson Correlation	.334**	1	.011	.071
	Sig. (2-tailed)	.001	.	.916	.504
	N	90	90	90	90
School grade	Pearson Correlation	.087	.011	1	.417**
	Sig. (2-tailed)	.417	.916	.	.000
	N	90	90	90	90
Previous grade in social studies	Pearson Correlation	.070	.071	.417**	1
	Sig. (2-tailed)	.515	.504	.000	.
	N	90	90	90	90

**. Correlation is significant at the 0.01 level (2-tailed).

Regression

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	TOTSCORE[a]	.	Enter

a. All requested variables entered.

b. Dependent Variable: Post-comprehensioln

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.179[a]	.032	.021	9.71385	.032	2.913	1	88	.091

a. Predictors: (Constant), TOTSCORE

b. Dependent Variable: Post-comprehensioln

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	274.901	1	274.901	2.913	.091[a]
	Residual	8303.588	88	94.359		
	Total	8578.489	89			

a. Predictors: (Constant), TOTSCORE

b. Dependent Variable: Post-comprehensioln

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	49.998	6.694		7.469	.000
	TOTSCORE	3.371	1.975	.179	1.707	.091

a. Dependent Variable: Post-comprehensioln

Casewise Diagnostics[a]

Case Number	Std. Residual	Post-compr ehensioln
8	-3.372	28.00

a. Dependent Variable: Post-comprehensioln

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	55.4015	66.4993	61.2889	1.75749	90
Residual	-32.7584	17.2374	.0000	9.65913	90
Std. Predicted Value	-3.350	2.965	.000	1.000	90
Std. Residual	-3.372	1.775	.000	.994	90

a. Dependent Variable: Post-comprehensioln

Graph